

Please read these instructions before installing or commissioning.
This Solar Thermal Domestic Hot Water System should only be
installed by a competent person.

**PLEASE LEAVE THESE INSTRUCTIONS WITH THE
USER FOR SAFE KEEPING.**

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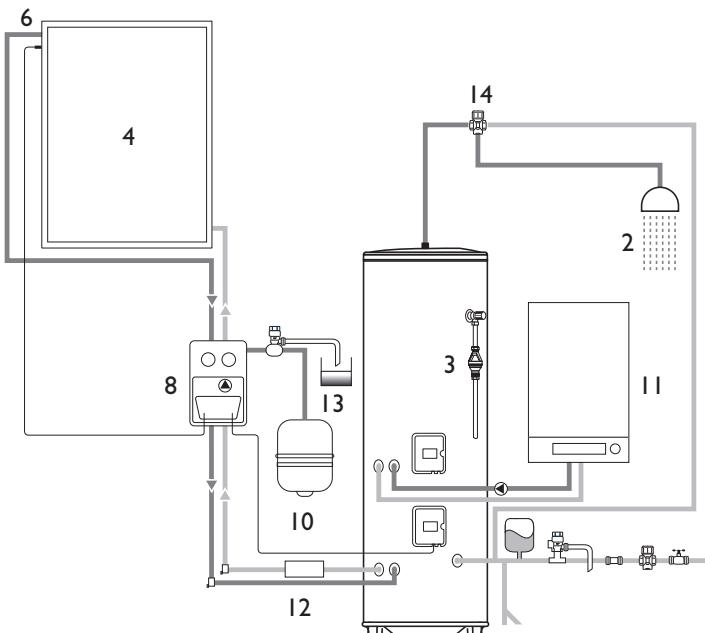


Fig. 1

- 1 Cold Supply for Domestic Hot Water
- 2 Domestic Hot Water Outlet
- 3 Auxiliary Discharge Arrangement
- 4 Solar Collector I
- 5 Solar Collector 2 (For East / West Array Installation)
- 6 Collector Sensor I (PT 1000)
- 7 Collector Sensor 2 (PT 1000)
- 8 Solar Pumping Station with Controller
- 9 Solar Pumping Station Cascade Module
- 10 Solar Expansion Vessel
- 11 Auxiliary Heat Source (Central Heating Boiler)
- 12 Flow Meter on a 'COMMON' Return (Accessory code 84515064)
- 13 Solar Fluid Discharge Vessel (Accessory code 720294601)
- 14 Thermostatic Blending Valve (Accessory code 720223301)

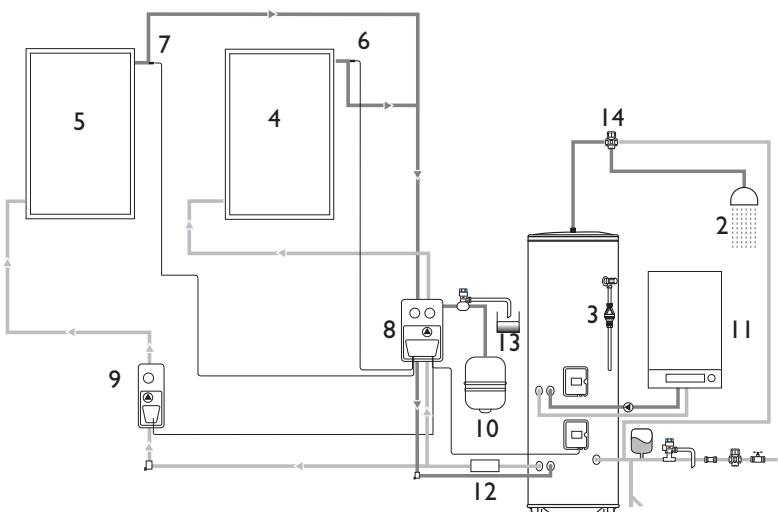


Fig. 2

1.1 Description

1. Thank you for purchasing a high quality Solar Thermal Domestic Hot Water System.

2. The sun is the ultimate source of most of our renewable energy supplies. Energy from the sun is clean and abundant.

3. There is a widely held opinion that the UK does not have enough sun to make solar systems worthwhile. In fact parts of the UK have annual solar radiation levels equal to 60% of those experienced at the equator.

4. However, this energy is not received uniformly throughout the year. Some 70% of UK annual radiation is received over the period April to September and 25% is received in the months of June and July.

5. Solar water heating technology captures energy from the sun and transfers this to a water heater to raise the water temperature therefore reducing the reliance on fossil fuel energies such as gas, oil and electricity. Up to 60% of a dwelling's annual hot water requirement can be provided by a solar water heating system. The balance is provided by traditional means via a second heat exchanger connected to a fossil fuel boiler or electrical heating by electric boiler or immersion heater.

6. The water heating system provides all the principal components required for an efficient solar water heating system. The sun's energy is captured by a series of solar collector panels through which a special heat transfer fluid is pumped. As the fluid passes through the collector panels its temperature is raised. The heated fluid is circulated through a heat exchanger coil in the base of the solar storage cylinder transferring the heat gained to the stored water, gradually raising its temperature. The cooled fluid then returns to the collector panel to be heated again. Heating by the solar coil is controlled by a solar differential temperature controller that ensures the system will only operate when there is useful solar heating gain at the collector panel. As the sun's energy input to the collector panels is variable supplementary heating by a conventional boiler or electric immersion heater should be provided. The optional cylinders that can be supplied with the package provide a supplementary heat exchanger coil and immersion heater as standard.

2.0 Hydraulic station specifications

2.1 Technical data

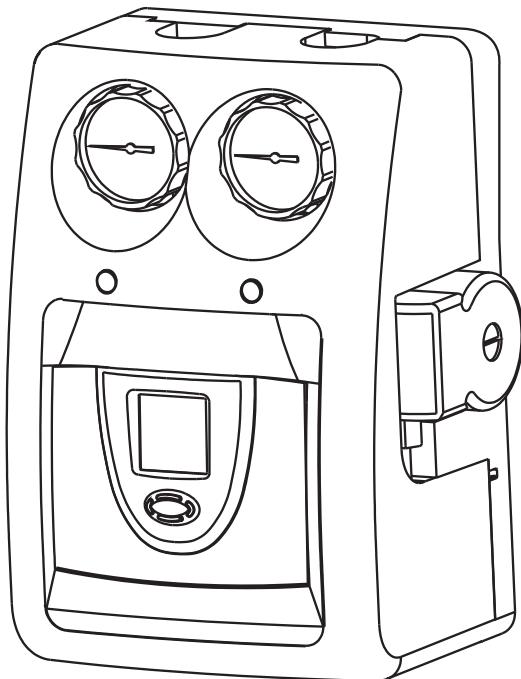


Fig. 3 System Module

Dimensions (Height/Width/Depth)

System Module

Pump Station 375/250/190mm

Cascade Module

Pump Station 375/190/190mm

Flow and return connections
(compression fittings) 22mm

Maximum working temperature: 160°C

Maximum working pressure: 6 bar

Pressure Relief Valve setting: 6 bar

Circulating Pump: Baxi

Circulating Pump voltage: 230/240 V ~

Power consumption Setting 1: 45W / 45W

Setting 2: 68W / 65W

Setting 3: 90W / 85W

Maximum Pump Head: 6 metres

Maximum Pump Capacity: 4.5 m³/h / 3.5 m³/h

Flow meter scale: 2 to 15 l/min

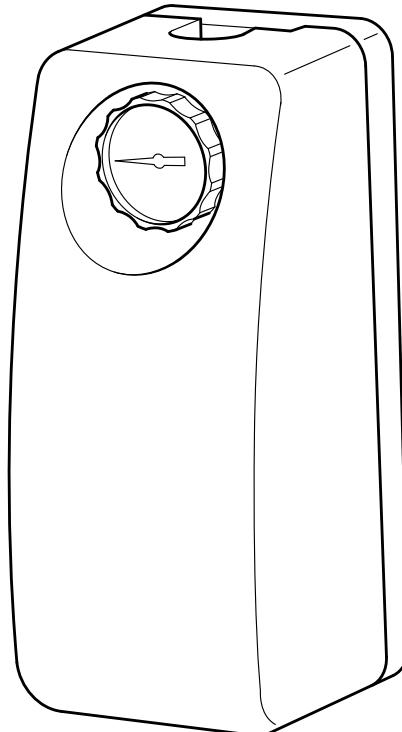


Fig. 4 Cascade Module

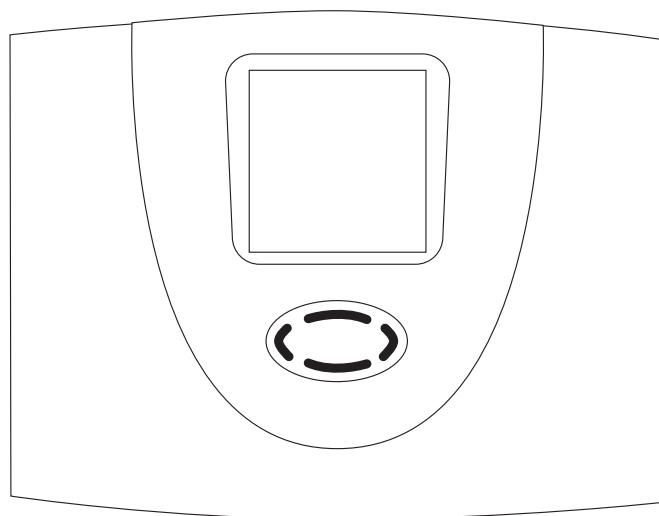


Fig. 5

3.1 Technical data

Housing

Material 100% recyclable ABS

Dimensions

L x W x D in mm 175 x 134 x 56

weight ca. 360 g

Ingress protection

IP40 according to VDE 0470

Electrical values

Operating voltage 230/240V ~ 50 Hz

Interference grade N according to VDE 0875

Max. conductor

cross-section

240V-connections 2.5 mm² fine-strand/single-wireTemperature sensor /
temperature range

PTF6 - 25°C to 200°C

PT1000, 1,000 kΩ at 0°C

Test voltage

4 kV 1 min according to
VDE 0631

Switching voltage

230V / 240V

Capability per one
switch output

1A / ca. 230VA for cos j = 0,7-1,0

Total capability of
all outputs

2A / ca. 460VA maximum

Fuse protection

fine-wire fuse 5 x 20mm, 2A/T
(2 amperes, slow)

Features

Self explanatory, menu driven operation

Adjustable control values

System monitoring

Energy yield, (solar gain) measurement

Suitable for flat plate and evacuated tube type collectors

Reheat thermostat function

Can be used in a number of system configurations

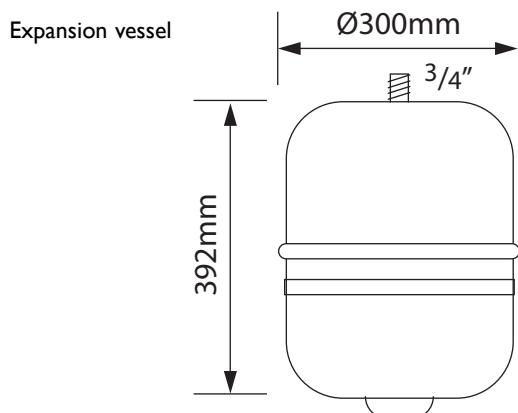


Fig. 6

4.1 Expansion vessel

1. Membrane expansion tanks for solar primary heating circuit. Manufactured according to the Directive PED 97/23/CE (approved noZ-DDK-MUC-02-396876-04).

2. Butyl membrane suitable for solar primary heating fluid, DIN 4807-3 approval.

Maximum working temperature +110°C.

Maximum percentage of glycol 50%.

Connection: 3/4" BSP male parallel

3. Expansion vessel supplied with wall mounting bracket and self sealing vessel connection that will allow removal of the vessel for maintenance without losing solar heat transfer fluid.

4.2 Solar heat transfer fluid

1. The system uses a sealed system indirect solar primary circuit which must be filled with the solar heat transfer fluid provided. This is a Pre-mixed (40% glycol / 60% water) Solar thermal transfer fluid, based on 1,2 - propylene glycol with corrosion inhibitors. It is Non-toxic, odourless, bio-degradable.

2. **DO NOT** mix the fluid with other types.

3. The use of chemical resistant gloves and suitable eye protection is required when handling.

4. A full safety data sheet is available on request.

5. The system should be filled when there is no direct radiation from the sun. If direct radiation occurs the collector panels should be shaded by covering them during filling and flushing.

6. Although the solar heat transfer fluid is non corrosive and bio-degradable appropriate precautions should be taken when handling.

7. Wash with soap and water if the fluid comes into contact with skin.

8. If fluid gets into eyes, immediately rinse with large quantities of clear running water.

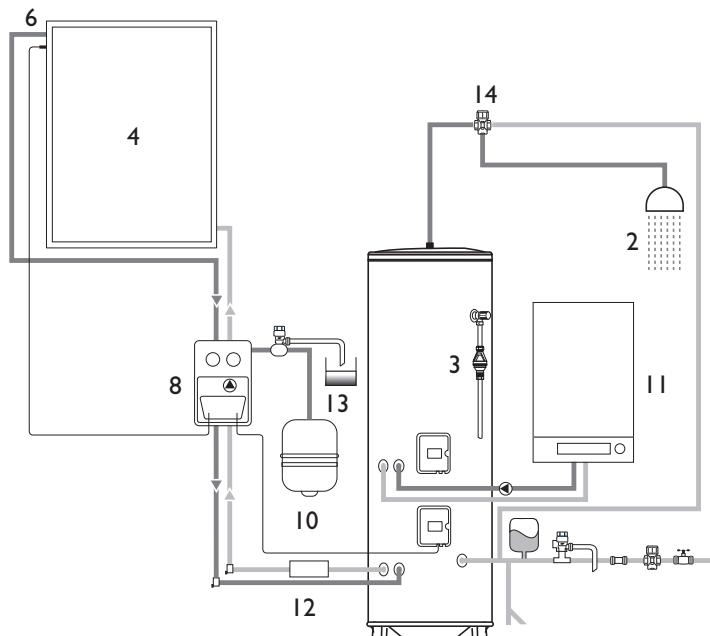
9. The solar heat transfer fluid must be pumped into the system. The pump can be electric or manual but must be capable of producing a pressure of at least 2 bar. The system should be thoroughly flushed to remove any contaminants in the solar primary circuit prior to filling with the heat transfer fluid.

10. The fluid is supplied in 20 litre container.
Weight of container full - 21kg.

11. Systems found to have low glycol concentrations will not be covered by the warranty.

5.1 Unvented

Unvented system - schematic diagram



Note: Indirect twin coil unit shown.

Fig. 7

Nominal capacities 210, 250 and 300 litre.

Rating Immersion heater(s) 1 x 3 kW (indirect models), 2 x 3kW (direct models) @ 240V~.

Outer casing White plastic coated corrosion proofed steel.

Thermal insulation CFC/HCFC-free (ODP zero) flame-retardant expanded polyurethane (60mm thick). GWP 3.1 (Global Warming Potential).

Cylinder Duplex stainless steel.

Pressure testing To 15 bar.

Heat unit Titanium

element/s, incorporated into an easily removable heater plate, should replacement be necessary. Rated 3.0kW @ 240V~.

Primary coil (for Auxiliary boiler heating) 22mm diameter stainless steel. Coil in coil design for improved performance

Solar coil 25mm diameter stainless steel. Coil in coil design and large surface area for improved performance.

Thermostat

Direct models: Element thermostat adjustable from 10°C to 70°C.

Indirect models: Factory-fitted cylinder thermostat adjustable to 70°C.

Solar: Factory fitted control pocket suitable for insertion of solar controller temperature probe.

Factory fitted safety features:

Direct models: Manually re-settable cut-out on heating element operates at 85°C.

Indirect models: High limit thermal cut-out operates at 85°C. Wired in series with two-port motorised valve (supplied) to provide primary over temperature protection when using auxiliary (boiler) coil.

All models: Temperature and Pressure Relief Valve, factory set to operate at 10 bar and 90°C. High limit thermal cut-out operating at 85°C at solar coil position. Wired in series with the solar differential temperature controller to provide over temperature protection if overheating occurs from solar collector panels.

N.B. This must be used in an unvented installation to comply with the requirements of Building Regulation G3.

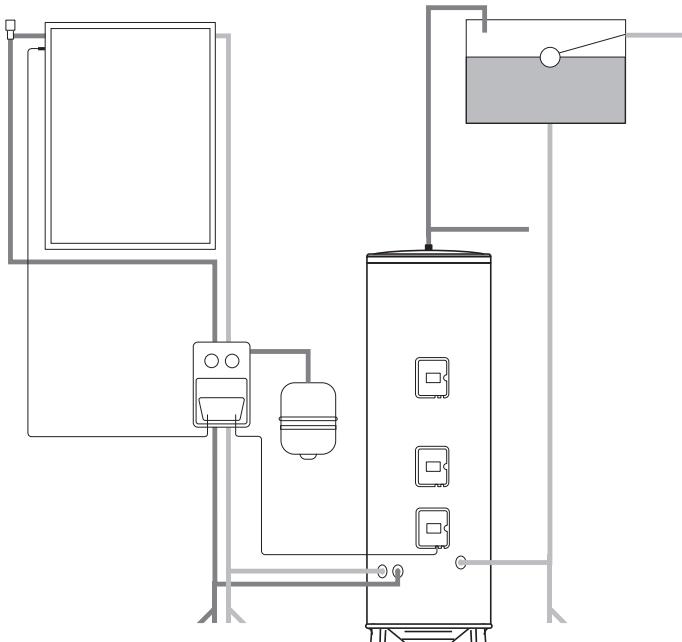
Anode Not required.

For full technical and performance specification see cylinder installation instructions.

The cylinders are unvented so installation must comply with Building Regulation G3 and / or other local regulatory requirements.

5.0 Cylinder specifications

Vented system - schematic diagram



Note: Direct unit shown. Auxiliary heating by immersion heater.

Fig. 8

5.2 Cistern-fed vented

Nominal capacities 210, 250 and 300 litre.

Rating Immersion heater(s) 1 x 3 kW (indirect models), 2 x 3kW (direct models) @ 240V~.

Outer casing White plastic coated corrosion proofed steel.

Thermal insulation CFC/HCFC-free (ODP zero) flame-retardant expanded polyurethane (60mm thick). GWP 3.1 (Global Warming Potential).

Water container Duplex 2304 stainless steel. 40 metres (4 bar) maximum working head.

Heat unit Titanium element/s, incorporated into an easily removable heater plate, should replacement be necessary. Rated 3.0kW @ 240V~.

Primary coil (for auxiliary boiler heating) 22mm diameter stainless steel. Coil in coil design for improved performance.

Solar coil 25mm diameter stainless steel. Coil in coil design and large surface area for improved performance.

Thermostat

Direct models: Element thermostat adjustable from 10°C to 70°C.

Indirect models: Factory-fitted cylinder thermostat from 10°C to 70°C.

Solar: Factory fitted control pocket suitable for insertion of solar controller temperature probe.

Safety features Thermostats with manually resettable thermal cut-out.

High limit thermal cut-out operating at 85°C at solar coil position. Wired in series with the solar differential temperature controller to provide over temperature protection if overheating occurs from solar collector panels.

Anode Not required.

For full technical and performance specification see cylinder installation instructions.

Detailed installation and commissioning instructions are supplied with the cylinders.

NOTE: The system is also compatible with cylinders configured for solar DHW systems. For installation and specification details refer to the manufacturers instructions supplied with the solar cylinder.

Any system installed using an unvented cylinder must comply with Building Regulations G3 and/or other Local Regulations.

6.1 Safety

1. In order to reduce the number of deaths and major accidents attributable to work at height, the Health and Safety Executive has introduced comprehensive regulations and guidance that should be followed by all businesses working at height.

2. We consider in the following paragraphs some of the main features of the regulations and guidance. This is, however, only a limited summary and it is recommended that all businesses planning on undertaking solar water heating installations obtain a copy of the regulations and guidance issued by the Health and Safety Executive and carefully consider the contents.

3. The regulations and guidance state that you are required to carry out a risk assessment for all work conducted at height and to put in place arrangements for:

- Eliminating or minimising risks from work at height.
- Safe systems of work for organising and performing work at height.
- Safe systems for selecting suitable work equipment.
- Safe systems for protecting people from the consequences of work at height.

4. **The regulations and guidance highlight a hierarchy for safe work at height:**

- **Avoid** the risk by not working at height if practicable.
- **Prevent** falls, where it is not reasonably practicable to avoid work at height; you are required to take suitable and sufficient steps to prevent the risk of a fall including selecting the most suitable work equipment (in accordance with the regulations).
- **Mitigate** the consequences of a fall; where the risk of a person or object falling still remains, take suitable and sufficient measures to minimise the distance and consequences of any fall.

5. Collective protection measures, such as guard rails on scaffold, should be given priority over personal protection measures, such as safety harnesses.

6. Within the regulations' framework, you are required to:

- a) Assess the risk to help you decide how to work safely.
- b) Follow the hierarchy for safe work at height (i.e. avoid, prevent and mitigate).
- c) Plan and organise your work properly, taking account of weather conditions and the possibility of emergencies.
- d) Make sure those working at height are competent.
- e) Make use of appropriate work equipment.
- f) Manage the risks from working on or around fragile surfaces and from falling objects.
- g) Inspect and maintain the work equipment to be used and inspect the place where the work will be carried out (including access and egress).

7. When preparing to install a solar water heating system, it is required that you perform a risk assessment in relation to work at height and plan how you will organise your work, taking into account the site, the weather conditions and the experience and competence of colleagues or contractors who may be working at height with you.

6.1 Safety (cont)

Risk Assessments

8. The HSE has published a number of very useful free publications that advise how to undertake risk assessments.

9. Two of these that you should obtain are:

Five Steps to Risk Assessment.

A Guide to Risk Assessment Requirements.

10. The five steps outlined in the HSE leaflet are:

Step 1: Look for the hazards, this will mean looking at the site and identifying significant hazards. These could be features such as a steep roof, a fragile surface where the collectors may be mounted, uneven ground or obstructions where access to the roof might be required.

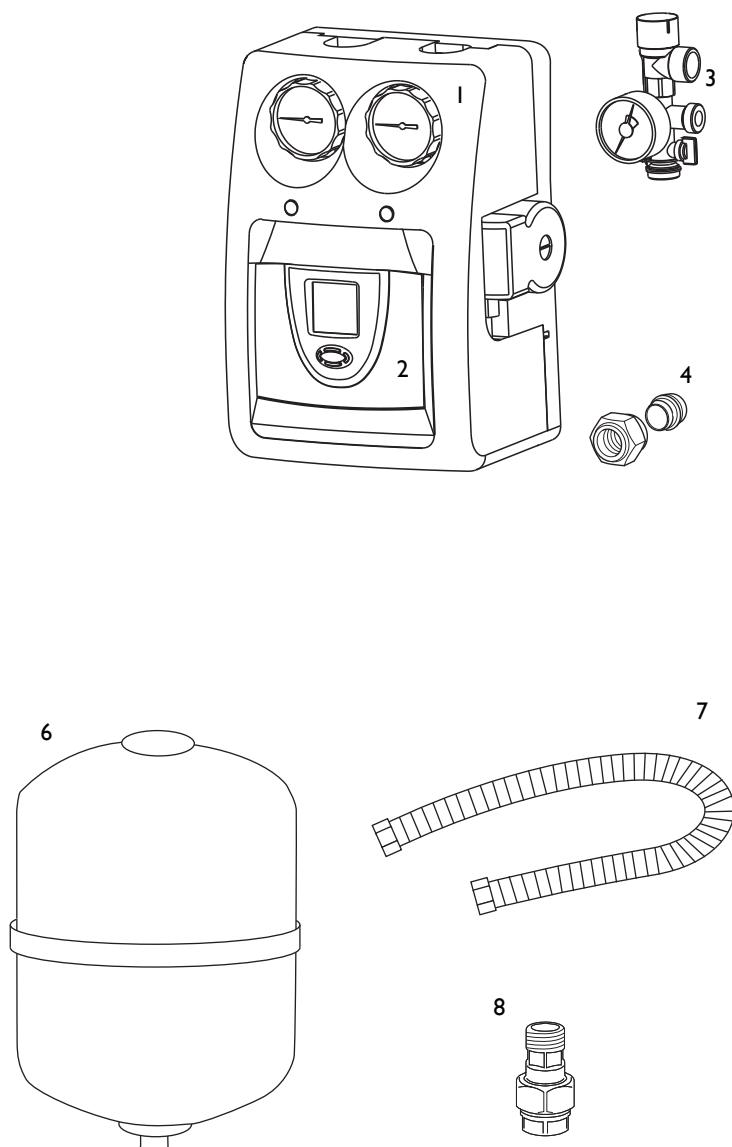
Step 2: Decide who may be harmed and how, this might mean considering the particular risks that young workers or trainees might face and thinking about the residents of the household or visitors who could be hurt by your activities.

Step 3: Evaluate the risks and decide which precautions should be made, you should consider how likely it is that each hazard will cause harm, decide which precautions you might take and then assess, after you have taken those precautions, whether the remaining risk will be high, medium or low. Where you identify remaining risks, you should consider which further action you could take to control the risks so that harm is unlikely.

Step 4: Record your findings, if you have fewer than five employees you do not need to write anything down, though it is useful to keep a written record of what you have done. If you employ five or more people you must record the significant findings of your assessment. You must also tell your employees about your findings. You need to be able to show that a proper check was made, that you considered who might be affected, that you dealt with all the obvious significant hazards, that the precautions you propose are reasonable and that the remaining risk is low.

Step 5: Review your assessment if necessary, each solar water heating installation may bring its own challenges and present its own particular hazards. You should therefore be careful not to rely on a "standard" risk assessment for installing a solar water heating system in a house, but review the particular hazards for each new situation. The issue of work equipment must be considered, but at the preparation stage you should consider where scaffold or other access equipment might be positioned and look out for any obvious obstacles to this, such as a conservatory or porch. In addition to the risks associated with work at height, you should also consider the risks associated with lifting and carrying solar collectors, using electric drills and using blow lamps or blow torches for soldering. This is not an exclusive list and so you should consider all aspects of the proposed installation to assess whether there are additional risks that need to be taken into account.

Fig. 9 (Diagrams not to scale)



7.1 Parts list

Before commencing the installation check all listed components are contained in the following cartons.

Hydraulic Station carton:

1. Hydraulic pump station with insulation incorporating wall mounting bracket.
2. Solar differential temperature controller.
3. Safety group, comprising- Pressure relief valve, pressure gauge and fill & drain valve.
4. 22mm compression fitting nut and olive(4 off).
5. Sensor extension cable (13m) (not shown).

Ancillary component carton:

6. Solar expansion vessel complete with mounting bracket and strap assembly.
7. Expansion vessel connecting hose.
8. Expansion vessel self sealing connection.

7.2 Identification of components

1. The main components of the hydraulic station are:

- Two isolating valves (Fig. 10, Item 1 & 2) with integral thermometers which display the solar primary flow and return temperatures.
- A safety group (Fig. 10, Item 3, supplied unconnected), which protects the solar primary circuit. The pressure relief valve and pressure gauge are integrated in the safety group.
- A non-return valve in both feed and return prevents the possibility of gravity circulation in the solar primary circuit.
- A solar circulation pump (Fig. 10, Item 4).
- A flow meter with fill & drain valve and shut-off valve (Fig. 10, Item 5).
- An air separator.

2. The heat transfer fluid is circulated by the solar circulation pump integrated in the hydraulic pump station (Fig. 10).

3. The hydraulic station has a solar differential temperature controller (Fig. 10 Item 6) integrated into the front insulation moulding. This is pre-wired to the solar pump.

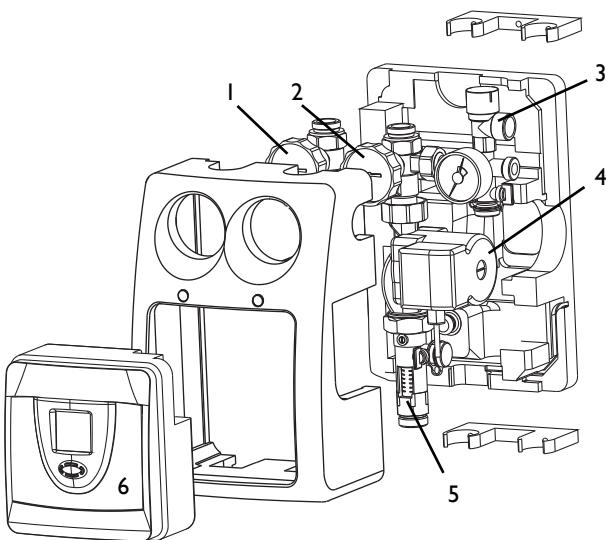
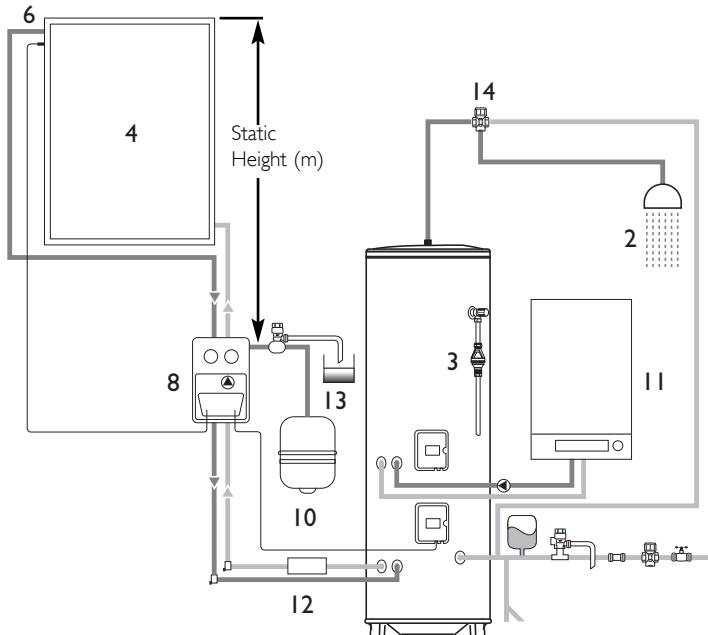


Fig. 10

Fig. 11



7.3

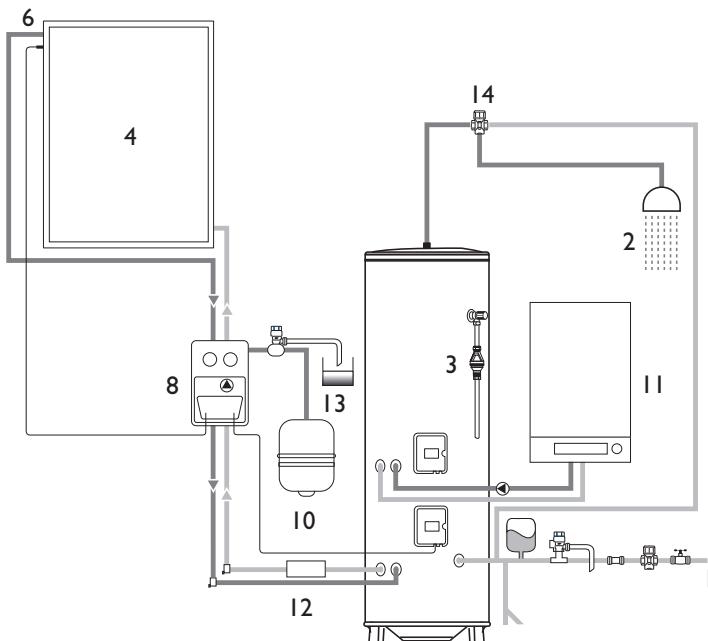
See Fig. 11

- 1 Cold Supply for Domestic Hot Water
- 2 Domestic Hot Water Outlet
- 3 Auxiliary Discharge Arrangement
- 4 Solar Collector 1
- 5 Solar Collector 2 (For East / West Array Installation)
- 6 Collector Sensor 1 (PT 1000)
- 7 Collector Sensor 2 (PT 1000)
- 8 Solar Pumping Station with Controller
- 9 Solar Pumping Station Cascade Module
- 10 Solar Expansion Vessel
- 11 Auxiliary Heat Source (Central Heating Boiler)
- 12 Flow Meter on a 'COMMON' Return (Accessory code 84515064)
- 13 Solar Fluid Discharge Vessel (Accessory code 720294601)
- 14 Thermostatic Blending Valve (Accessory code 720223301)

7.4 Pipework installation - general

1. In Solar Heating Systems, the collectors, the hydraulic station and solar cylinder (Fig. 11, Item 1) must be connected with brazed or silver soldered copper pipes, compression fittings or the multifit accessory flexible steel tube and insulation. (See brochure for details) **N.B.** Plastic pipes **MUST NOT** be used.
2. Connections supplied are suitable for pipe diameters of 22mm. However for short pipe runs (up to 10m flow and return) the use of 15mm diameter pipe is acceptable.
3. All connections and joints must be resistant to temperatures of up to 150°C and resistant to glycol.
4. If any pipe sealants are used these should be resistant to glycol and be able to withstand temperatures of up to 150°C.
5. The difference in height between the highest point in the pipework (collector) and the level of the hydraulic pump station determines the static head for the system. The static head is 0.1 bar times this height in metres. This static head is used when setting the expansion vessel precharge pressure and the system pressure.
6. If the static head is greater than 1.5 bar (15m) then a larger expansion vessel may be required for larger collector arrays.
7. If the pipe runs between the solar collector and pump station are short (<6m) then a protection vessel (Accessory No. 5131963) should be installed between the pump station and expansion vessel.
8. Earthing pipework
All solar primary pipework between the solar collectors, hydraulic station and solar cylinder should be earth bonded in accordance with current IEE wiring regulations.;

Fig. 12



See Section 7.3 for Key

7.4 Pipework installation - general (cont)

9. Venting the pipework

The hydraulic station the component includes an air collector/sePARATOR and bleed point so an automatic air vent is not necessary. Any section of solar pipework that falls and rises again should be fitted with an additional air vent valve to relieve any trapped air which may cause air locking in the system. The automatic air vent and isolating valve used must be compatible with solar primary systems, i.e. be resistant to glycol and temperatures up to 180°C.

10. Insulating the pipework

External pipework should be insulated with high temperature resistant materials and be protected against UV degradation. The insulation must be peck-proof and rodent-proof. Internal pipework, especially through unheated spaces such as a loft space, should also be insulated with high temperature resistant materials. Mark the outside of any insulation to identify the flow and return pipes. The collectors are supplied with 2x2m pre insulated flexible stainless steel tubes. Additional lengths (30m) of stainless steel flexible tubes and high temperature insulation can be supplied.

Fig. 13

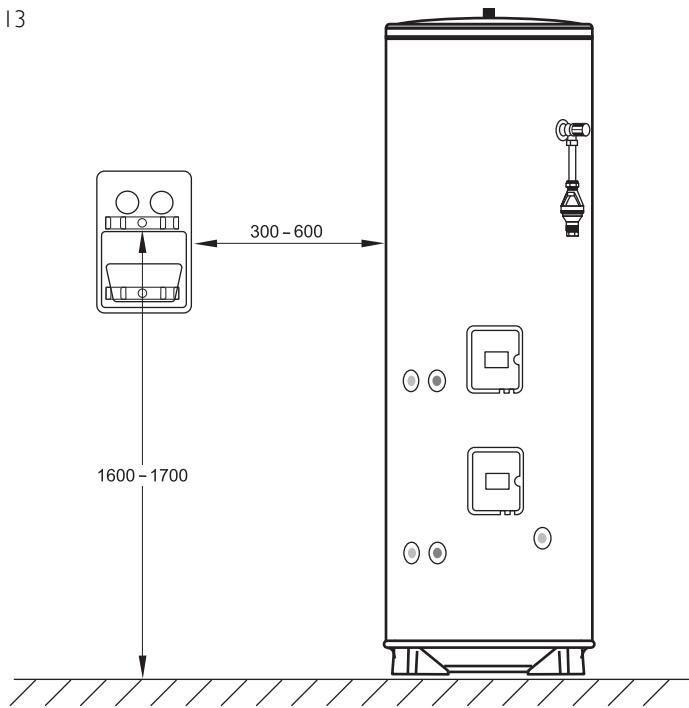
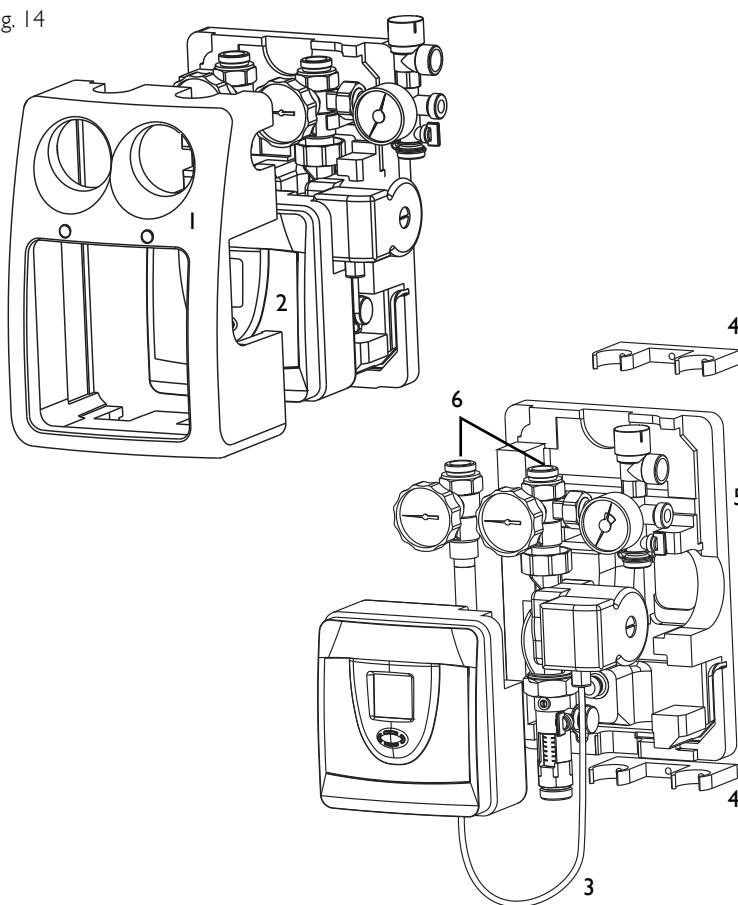


Fig. 14



7.5 Installing the hydraulic station - positioning

1. It is usual to install the hydraulic station and solar differential temperature controller near to the solar cylinder. However this does not have to be the case, the hydraulic station can be installed anywhere convenient on the solar primary pipework although adequate access will be necessary for commissioning and maintenance (See also comments regarding system static head given in Section 7.4).

2. The solar differential controller should also be accessible for system operational monitoring. If not in close proximity to the solar cylinder it will be necessary to extend the solar cylinder temperature sensor cable, refer to section 9.6 for details of how to do this.

3. It is recommended that the upper mounting bracket of the hydraulic station is positioned approx. 1600 to 1700mm above the floor level for ease of access and operation of the controls, see Fig. 13.

4. When choosing the site for the hydraulic station provision of a discharge pipe from the safety group and the location of the solar expansion vessel must be considered.

7.6 Installing the wall brackets and hydraulic station

1. Remove the front insulation moulding (Fig 14. Item 1) by pulling forward whilst holding the solar differential controller moulding (Fig 14. Item 2) in place, carefully remove the solar differential controller mounting by pulling forward and disconnect the pump cable connector (Fig 14. Item 3).

2. Place the hydraulic assembly on the wall at the desired location and mark the fixing positions through the holes in the mounting brackets.

3. Remove the hydraulic assembly from the mounting brackets (Fig 14. Item 4) and remove rear insulation moulding (Fig 14. Item 5).

4. Drill and plug the mounting positions and screw the mounting brackets into position.

5. Push the rear insulation moulding over the wall brackets and refit the hydraulic assembly (Fig 14. Item 6) to the mounting clips on the wall brackets.

Fig. 15

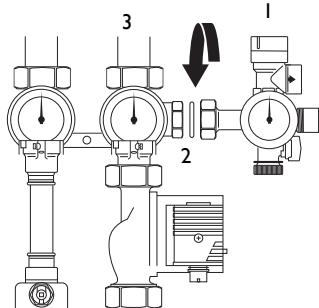


Fig. 16

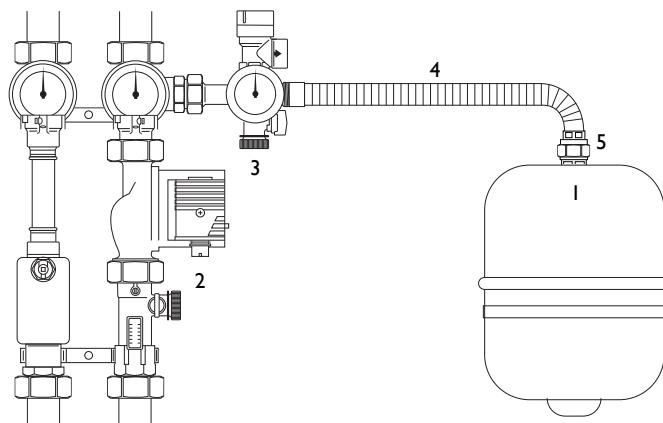


Fig. 17

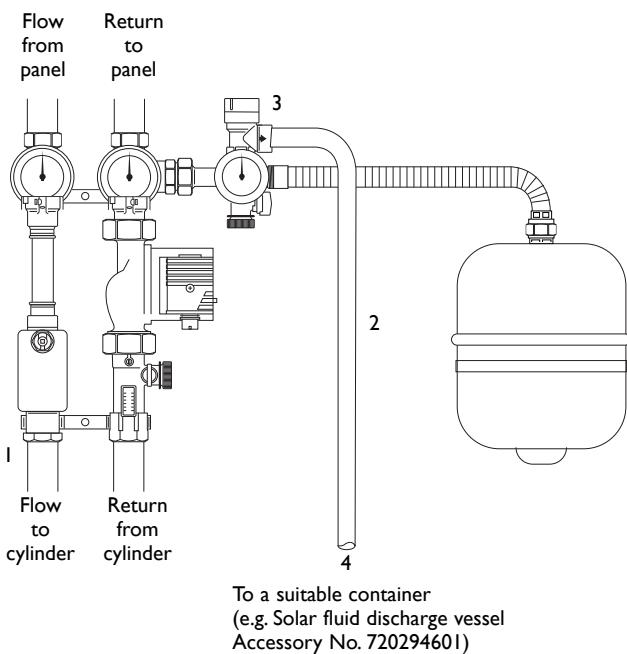
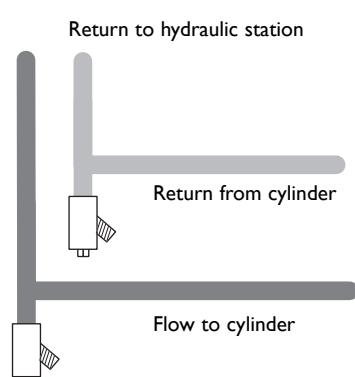


Fig. 18



7.0 Installation of hydraulic station

7.7 Installing the safety group

1. Connect the safety group (Fig 15 Item 1) to the connection on the hydraulic station return isolating valve assembly (Fig 15 Item 3). Ensure that the pre-fitted gasket is securely in place on the safety group prior to connection.

7.8 Connecting the solar expansion vessel

1. Mount the solar expansion vessel (Fig 16 Item 1) adjacent to the hydraulic station (Fig 16 Item 2) so that the vessel can be connected to the vessel connection of the safety group (Fig 16 Item 3) using the flexible pipe (Fig 16 Item 4) supplied. (**Note:** Solar expansion vessel, mounting bracket, self sealing connection and flexible pipe are supplied in the Ancillary Components kit).
2. The vessel must be mounted as shown (connection to top) and securely supported using the wall bracket supplied. The self sealing vessel connection should be screwed onto the vessel connection before connecting the flexible pipe (Fig. 16 Item 5).

3. **DO NOT** replace the solar expansion vessel with either a potable water expansion vessel or boiler sealed system vessel.

4. The charge pressure of the solar expansion vessel must be adjusted (when the fluid circuit is empty or de-pressurised) to a pressure equal to the static head + 0.4 bar; or a minimum of 1.2 bar. (**Note:** the static head is the height difference between the highest point in the pipework (collector) and the hydraulic station in metres x 0.1 bar. The charge pressure should not normally exceed 1.9 bar - see also Section 7.4).

7.9 Connecting pipework

1. Connect the flow and return pipes to the pump station via compression fittings (Fig 17 Item 1). Fittings are for 22mm o/dia pipe. Support the hydraulic assembly when tightening connections.

2. Installing a drain valve

It is recommended to install a device for draining the solar heating system (tee piece with drain valve, Fig. 18) into the flow and return at the lowest point in the solar heating system. The drain and its rubber seal must be suitable for solar applications.

3. Connecting the solar cylinder

For detailed installation instructions refer to the installation instructions supplied with the solar cylinder.

Fig. 19

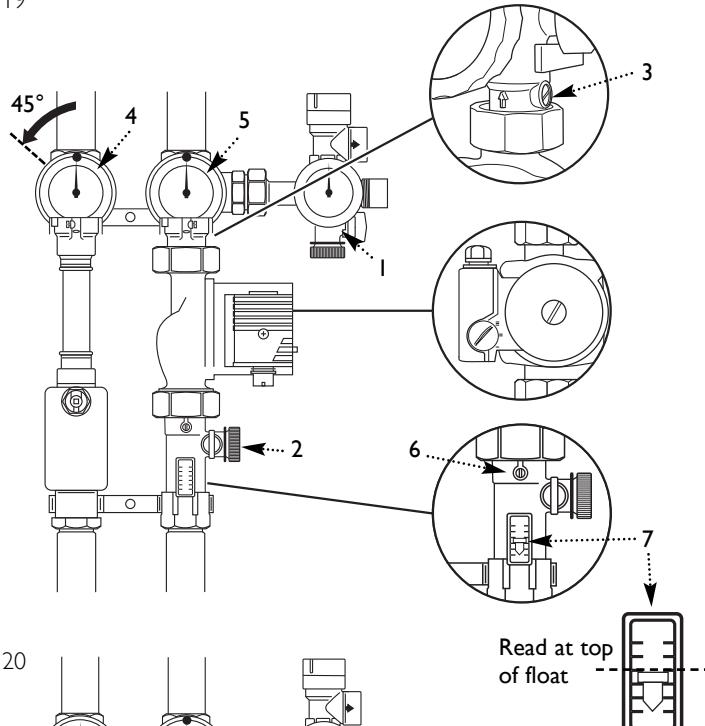


Fig. 20

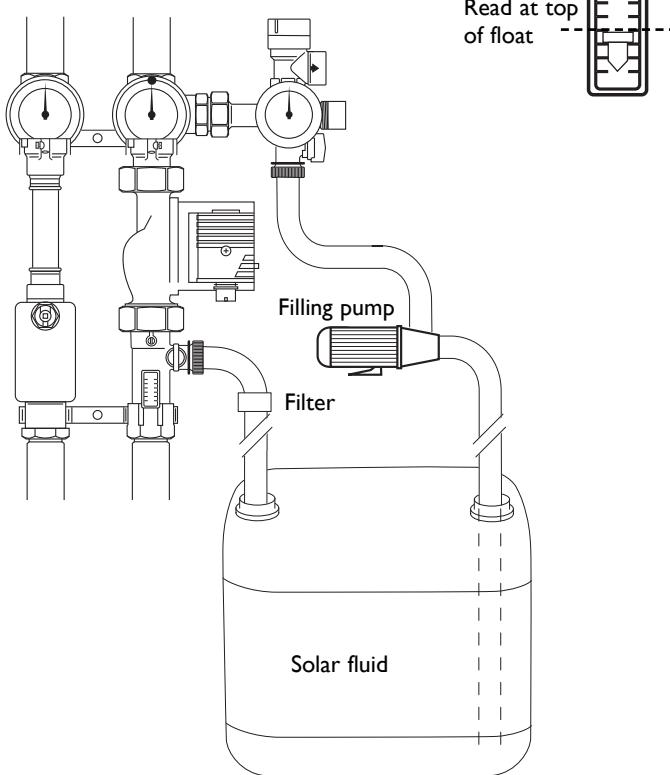
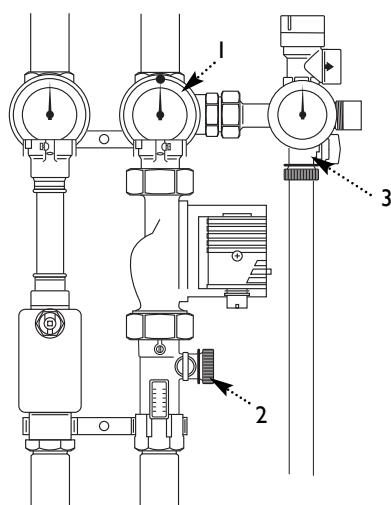


Fig. 21



8.0 Commissioning of system

8.1 Air Test

1. An air test may be used on the pipework to detect any gross leakage prior to flushing and filling with solar heat transfer fluid. Pressurise the system to a maximum of 1 bar to check for leaks.

2. Ensure that the solar expansion vessel pre-charge pressure has been set prior to flushing and filling.

8.2 Flushing and Filling the pipework

1. Before the system is commissioned the pipework must be flushed to remove any contaminants. **This must be done using the solar heat transfer fluid as it will be impossible to fully drain all parts of the system.**

2. Connect the flushing pipes to the fill & drain valve on the safety group (Fig. 19 Item 1) and to the fill & drain valve on the flow meter (Fig. 19 Item 2).

3. Open the fill & drain valves.

4. Turn the slot of the adjusting screw (Fig. 19 Item 3) in the return so the slot is vertical to open the non-return valve.

5. Turn the left hand isolating valve with integral thermometer in the flow (Fig. 19 Item 4) in the direction indicated by the arrow (to a 45° position) to open the non-return valve.

6. Ensure that the right hand isolating valve with integral thermometer in the return (Fig. 19 Item 5) is open indicated by the dot on the thermometer bezel being at the top.

7. Turn the slot of the flow meter adjusting screw (Fig. 19 Item 6) in the return vertically to open the flow limiter (Fig. 19 Item 7).

8. Flush the solar primary pump by pumping the fluid into the system via the fill and drain valve on the safety group (Fig. 19 Item 1).

9. Close right hand isolating valve (dot on thermometer bezel at 9 o'clock position). Flush solar primary pipework and collector via the fill and drain valve on the safety group. **If reusing flushed fluid ensure this is filtered before re-introducing into the system.** (see Fig. 20). Use a suitable container of a large enough volume to collect the fluid.

10. When satisfied that all pipework and component parts have been thoroughly flushed, the system can be filled.

8.0 Commissioning of system

8.3 Flushing and Filling the pipework (cont)

11. Pour an amount of the solar heat transfer fluid into the filling pump.

12. Close the fill and drain valve - safety group (Fig. 19 Item 1) and the fill and drain valve - flow meter (Fig. 19 Item 2) and pressurise the pump slightly prior to filling the system. If an electric pump is being used follow the instructions with the pump.

13. Fully open the fill and drain valve on the safety group (Fig 19, item 1) and pump fluid into the system. Whilst pumping, open the flow meter drain valve (Fig 19, item 2) slightly to allow the air to vent out of the system.

14. When the pump is down to approximately 1 litre isolate the fill and drain valves. Vent the filling pump and refill with solar heat transfer fluid.

15. Re-pressurise the filling pump and repeat steps 3 and 4 above until fluid is seen discharging from the drain valve on the flow meter. (Fig 19, item 2). Close the drain valve.

16. Continue filling at the fill and drain valve on the safety group (Fig 19, item 1) until the system pressure reaches 2 bar.

17. At this point the circulation pump should be vented. If the system pressure drops, repressurise using the procedure above.

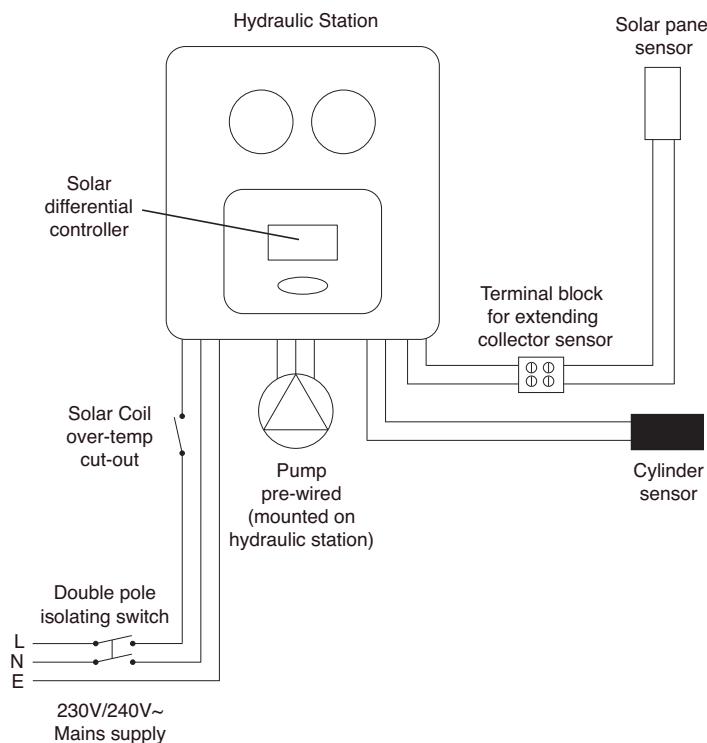
18. After venting the pump and checking that the system pressure is 2 bar; close the fill and drain valve on the safety group (Fig. 19 Item 1), and check the system for leaks.

19. Turn the left hand isolating valve (Fig 19, item 4) back 45° clockwise until the dot on the bezel is back at 12 o'clock.

20. Turn the right hand isolating valve (Fig. 19 Item 5) back 90° clockwise until the dot on the bezel is back at 12:00 O'clock.

21. Turn the slot of the adjusting screw (Fig. 19 Item 3) back to the horizontal position.

Fig. 22



The collector panel temperature sensor should be installed in the sensor pocket at the collector array flow connector as part of the first fix process. Ensure that the cable from this sensor can be identified for connection to the pump station wiring centre. Use the 13m extension cable supplied if required.

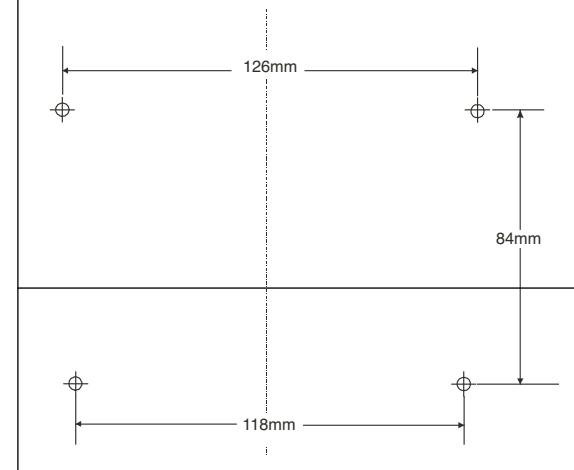
9.1 Appliance installation

1. **Always disconnect from the mains before opening the controller cover.** The solar differential temperature controller is designed to be mounted on the front of the hydraulic station. Alternatively it can be removed from the insulation and be wall mounted (see panel below). In the case of wall mounting the pump cable may need to be lengthened.

Alternative mounting option

In the case of wall installation proceed in the following way:

Drill installation holes according to the dimensions shown below. Screw in two upper screws up to 6 mm distance. Open the appliance as described in section 10.2 and hang it onto two screws. Now two lower screws can be mounted. Tighten all screws. Do not overtighten to avoid damage to the controller backplate.



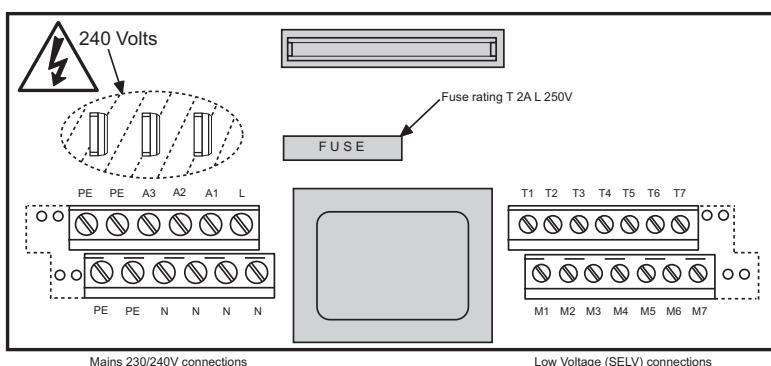
9.2 Opening the controller

1. Always disconnect from the mains before opening the controller cover.

2. No tools are required to open the controller. The front of the controller is secured by two latches which engage with the controller backplate.

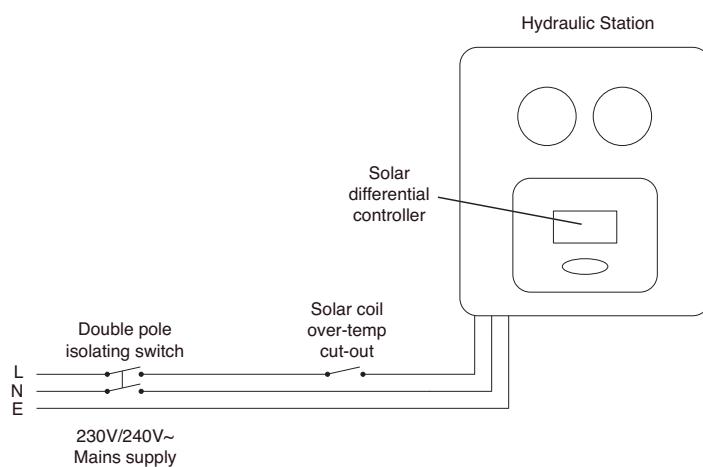
3. It can be opened by gently pulling the lower side edges outwards and then hinging the front upwards.

Fig. 23



Terminal Reference	Description
L	240V Supply Live
N	240V Supply Neutral
A1	Switched Output to Solar Pump
N	Solar Pump Neutral
A2	Switched Output - Live 2 (For East West Array or Dual Tanks)
N	Switched Output 2 Neutral
A3	Switched Output - Live 3 (For Auxiliary Heat Control)
N	Switched Output 3 Neutral
PE	Earth Connection
T1 & M1	Temperature Sensor Collector 1 (Tc1)
T2 & M2	Temperature Sensor Storage Tank 1 (Ts1)
T3 & M3	Temperature Sensor Collector 2/Storage Tank 2 (Tc2 / Ts2)
T4 & M4	Temperature Sensor Collector Return (Tret)
T5 & M5	Temperature Sensor for 2nd temperature differential controller (Tth)
T6 & M6	Frost Protection or 2nd temperature differential controller
T7 & M7	Flow Meter (Optional)

Fig. 24



9.3 Electrical connection overview

1. Always disconnect from the mains before opening the controller cover. The electrical installation must conform to all current Wiring Regulations and be carried out by a competent electrician.
2. The connection of all electrical cables is to the terminal block located on the backplate of the controller. The terminals on the right side of the terminal block are for extra low voltage connections (temperature sensors and flow transmitters). The terminals on the left side of the terminal block are for 230/240V~ connections.

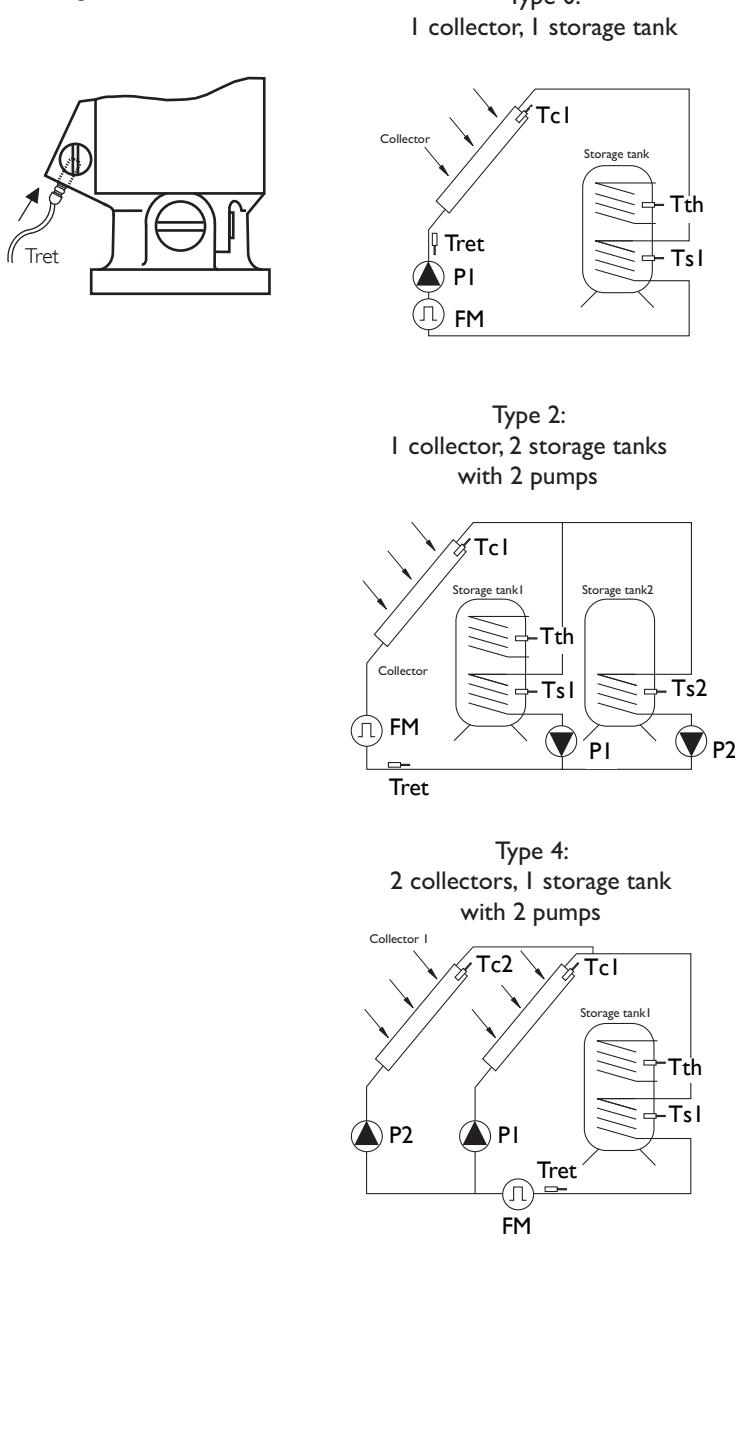
General connection guidelines.

3. In the case of all connecting wires the outer sheath should be stripped back to 80mm. The individual conductor sleeving should be stripped approx. 10mm.
4. Cables are inserted in the controller through knockouts provided in the controller backplate.
5. Flexible cables must be secured against straining by suitable strain relief bushes or devices.
6. The controller must be earthed.

9.4 230/240V~ connections

1. For 230V connections you must follow the following points:
2. The mains supply to the controller should be via a suitable double pole isolating switch with a contact separation of at least 3mm in both poles. Additionally the controller should be wired via the solar coil over temperature cutout such that power is interrupted to the controller and hydraulic station in the event of the cylinder overheating (see Fig. 24).
3. Controllers are intended for the operation in 230/240V~ /50Hz mains. Any motorised valves connected must be suitable for this voltage.
4. All earth wires must be connected to terminals marked with PE. Any bare wire earth conductors must be sleeved with green/yellow sleeving.
5. The neutral terminals (N) are electrically connected and are not switched.
6. All switch outputs (A1, A2 and A3) are 230/240V~ closers. If potential-free contacts are needed, appropriate accessories are required.

Fig. 25



9.0 Installation of solar controller

9.5 Solar Gain measurement

1. For solar gain (energy productivity) measurement in System type '0', it is necessary to fit the collector return sensor as shown in the diagram in Fig. 25, and input the correct flow value.

2. For System types 2 and 4, the collector return sensor must be securely attached to the common return pipework using the securing tiles supplied and then covered by insulation. Use cable ties (not supplied) to ensure good attachment and accurate readings.

3. The solar gain of the system is calculated on the basis of the temperature difference between the collector flow and return and the solar primary circulation flow rate.

4. The function is factory set-up as 'on' in the Solar Differential Temperature Controller.

5. For System Type 2 the additional pump (P2) can be ordered as an accessory, Part No. 7202943 together with appropriate sensor for cylinder 84515063.

6. For System type 4 use the East/West kit accessory as required (See Sales Brochure).

Key	Description
Tc1	Temperature Sensor - Collector 1
Tc2	Temperature Sensor - Collector 2
Tth	Temperature Sensor - Thermostat
Ts1	Temperature Sensor - Storage 1
Ts2	Temperature Sensor - Storage 2
Tret	Temperature Sensor - Collector Return
P1	Circulation Pump 1
P2	Circulation Pump 2
FM	Flow Meter
Tfr *	Temperature Sensor - Frost Protection

* not shown

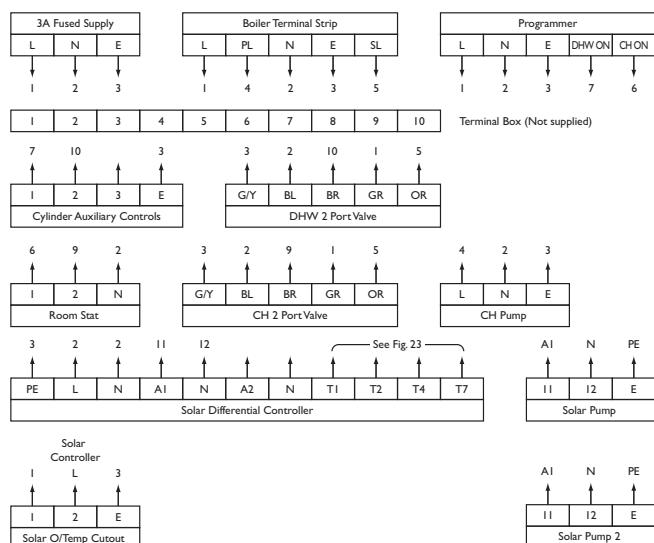
System type		Output terminal designation (see Fig. 23)				
Type	Description	A1	A2	A3		
0	1 collector array, 1 storage cylinder	P1	-	Cooling or thermostat or diff. controller		
2	1 collector array, 2 storage cylinder (pump-pump)	P1	P2	Cooling or thermostat or diff. controller		
4	2 collector arrays, 1 storage cylinder (pump-pump)	P1	P2	Cooling or thermostat or diff. controller		

System Type	System Description	T1	T2	T3	T4	T5	T6	T7
0	1 collector array, 1 storage cylinder	Tc1	Ts1	-	Tret	Tth	Tfr	FM
2	1 collector array, 2 storage cylinders	Tc1	Ts1	Ts2	Tret	Tth	Tfr	FM
4	2 collector arrays, 1 storage cylinder	Tc1	Ts1	Tc2	Tret	Tth	Tfr	FM

NOTE: The solar gain flowmeter must be connected to sensor terminals marked T7 where fitted (see Fig. 23).

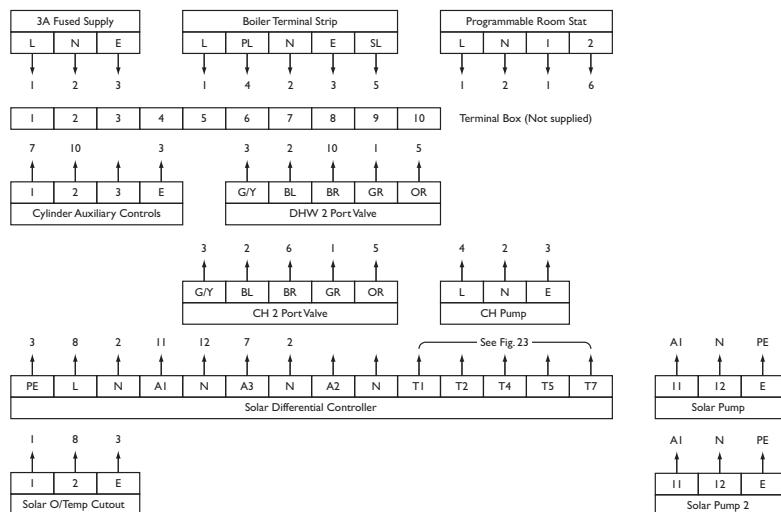
Block Wiring Schemes

A. In conjunction with auxiliary heating by boiler - no reheat control by solar controller.

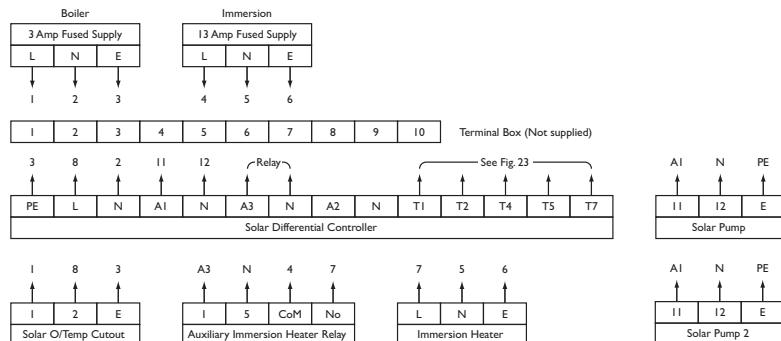


Note: For Boilers without Pump over run CH Pump Live Supply to 5

B. In conjunction with auxiliary heating by boiler - reheat control via solar controller.



C. Solar Cylinder with auxiliary heating by immersion heater.



9.0 Installation of solar controller

9.6 Connection of temperature sensors

1. The controller uses precise platinum temperature sensors type PT1000. The controller is supplied with 3 sensors ready wired. The sensor with black silicone sheathing (supplied with the first fix kit) must be used for the solar panel sensor.

2. Installation / cabling of temperature sensors:

a) Mount the sensors in the pockets provided in the collector and storage tank. When installing into the collector panel sensor pocket the sensor should be secured by sealing with UV resistant High Temperature Silicone sealant.

b) The wires of the temperature sensors can be lengthened. Up to 15m long you need a 2 x 0,5mm² cross-section, up to 50m 2 x 0,75mm². In the case of long connections (collector) shielded extension lead must be used. **DO NOT** run sensor leads adjacent to mains carrying voltage conductors (at least 50mm separation is recommended).

c) Temperature sensors are supplied connected to the appropriate terminals, refer to Fig 26. The sensors are polarity free.

d) Sensors **MUST NOT** be connected to the 230/240V~ terminals.

9.7 Control of Auxiliary heat input

1. When using the reheat function the operation of the auxiliary heat input device can be controlled via output A3 from the controller (see fig. 23(c)).

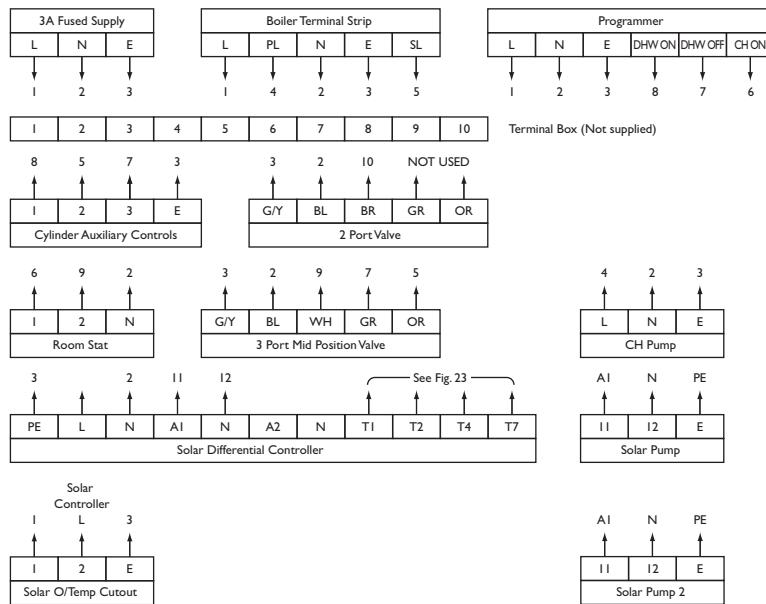
2. The reheat sensor cable is connected to terminals T5 of the solar controller (see page 20) and the sensor element be inserted into the controls pocket at the auxiliary heater level.

3. **N.B.** The maximum switching current of the controller is 2A so if switching an electrical immersion heater this **MUST** be done via a relay (see Fig. 26 Block Wiring Scheme C) order accessory code No. 5122765.

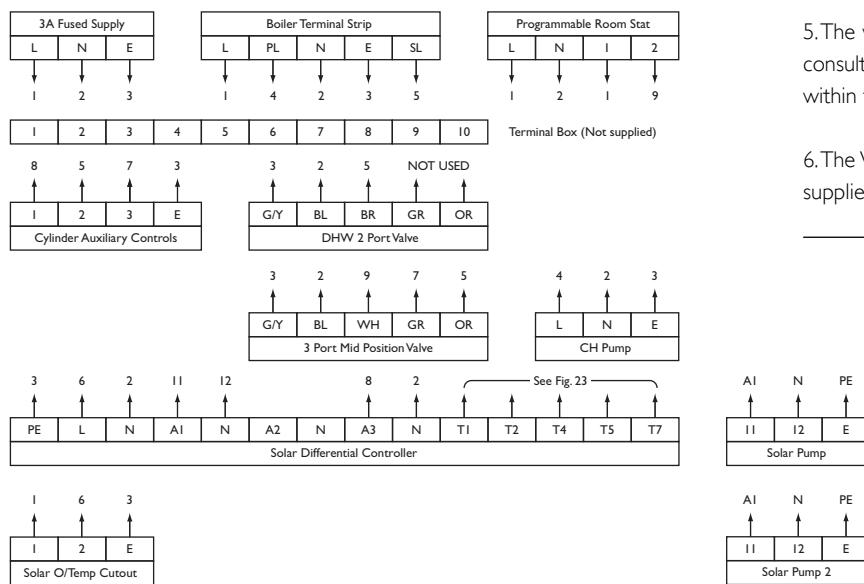
4. If using a boiler for auxiliary input, the output from the reheat function should be integrated into the boiler control circuit.

Fig. 26

D. Auxiliary heating by boiler with 3 port mid position valve system
- no reheat control by solar controller.



E. Auxiliary heating by boiler with 3 port mid position valve system
- reheat control by solar controller.



7.8

I. Key to abbreviations:

-	Live
-	Neutral
-	Earth
PL	Pump Live
SL	Switched Live
G/Y	Green and Yellow
BL	Blue
BR	Brown
GR	Grey
OR	Orange
WH	White

2. The wiring schemes assume the use of an unvented Solar DHW cylinders.

3. These diagrams are presented for guidance only, terminal numbers may differ between different manufacturers equipment.

4. Baxi accept no liability for any loss or damage arising from any errors or omissions that may be inadvertently contained within these diagrams.

5. The various ancillary equipment manufacturers should be consulted to confirm the correct operation of their products within the system.

6. The Warranty only applies to equipment and controls supplied with the system.

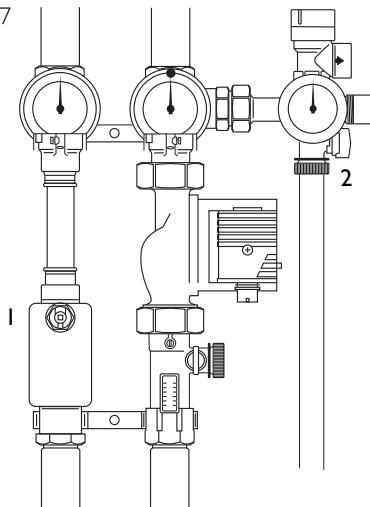
10.0 Commissioning of hydraulic station

10.1 Ensure the solar primary system is free from air

1. Switch on the power supply to the solar differential temperature controller.
2. Manually switch the circulation pump ON and OFF via the solar differential temperature controller (see section 11.5) to pump fluid around the solar primary system.

3. Turn the pump off and open the airbleed screw on the air separator (Fig. 27 Item 1). Bleed any air from the air separator. If the system pressure drops top up by opening the fill and drain valve (Fig. 27 Item 2) on the safety group and pumping in more solar fluid to restore the pressure. This must be repeated until the pressure remains stable.

Fig. 27

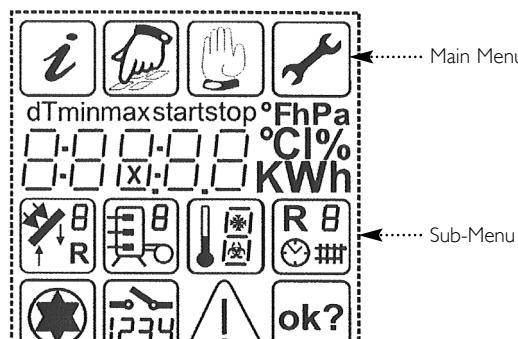


10.2 Setting the system pressure

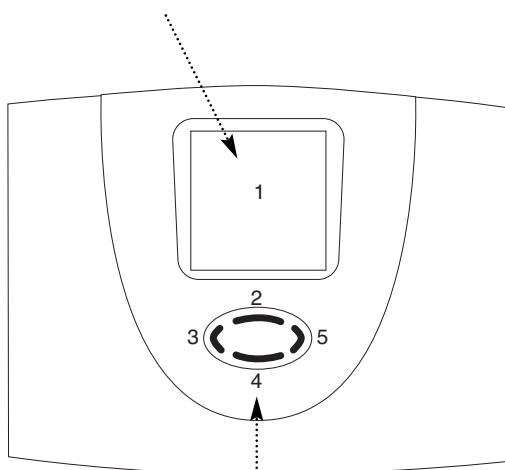
1. During commissioning, the system pressure should be 0.7 bar above the static pressure (1 metre height differential equals 0.1 bar). However, it must be at least 1.5 bar and no higher than 2.2 bar.
2. Determine the system pressure when the system is cold (20°C). This should be recorded on the Commissioning Record Sheet.
3. If the pressure is too low you should pump additional heat transfer fluid into the system; the fill & drain valve on the safety group (Fig. 27 Item 2) needs to be opened for this purpose. When system pressure is correctly set, ensure the fill and drain valve is closed and remove filling hose from safety group.

Fig. 28

Diagram of all possible symbols



Display Screen



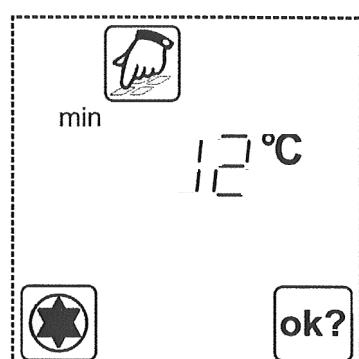
2 Control Button
Scroll upwards

4 Scroll downwards or select required main menu

3 Scroll left or exit to main menu

5 Scroll right or select to edit function

Example Screen - Programming Menu



11.0 Commissioning of solar controller

On completion of commissioning the Solar Controller, note all the required information in the Solar Commissioning Record Sheet at the end of Section 12.

11.1 Main Menu

To make the operation of the controller clear, operating and display functions are divided into 4 main menus.



Info

Indication of current measured values.
Indication of system condition.
Indication of error messages.
Indication of operating hours and energy productivity (if installed).



Programming

Changes to programmable values (parameters).



Manual operation

Switching on and off connected pumps and auxiliary devices.

WARNING - During manual operation there is no automatic regulation of the system. Temperature control is isolated. System temperature could be extremely high.



Basic adjustment

Information about basic adjustment for system function. To carry out any changes to this menu it must be selected within the first minute after switching the appliance on.

IMPORTANT: Adjustment and changes in this menu must only be carried out by a competent installer or service engineer.

Each active menu is shown in the upper line of the display by its corresponding icon.

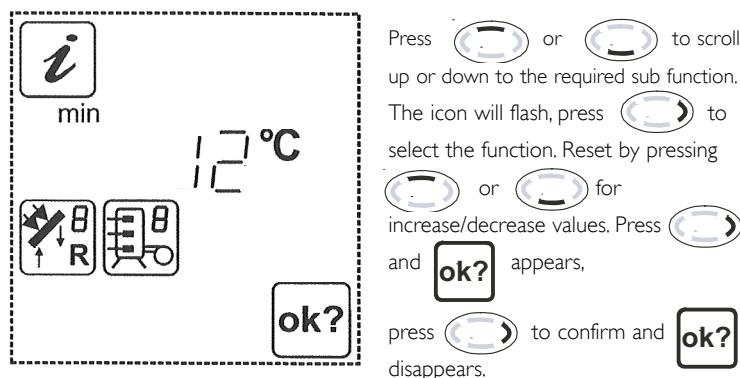
11.2 Control Button

When in the Main Menu the control button functions are as follows:

Item 2 - Scroll upwards-	no function in this menu
Item 3 - Scroll left	- moves left through the main menu options
Item 4 - Scroll down	- selects the menu option currently flashing and gives access to the sub-menu
Item 5 - Scroll right	- moves right through the main menu options

Once the sub-menu has been accessed, the flashing symbol becomes static and the button functions are then as follows:

Item 2 - Scroll upwards-	moves up through the available functions of the sub-menu
Item 3 - Scroll left	- return to main menu
Item 4 - Scroll down	- moves down through the available functions of the sub-menu
Item 5 - Scroll right	- select to edit the function displayed. The selected function will flash if it is available for editing. Use 2 to increase the required value and 4 to reduce it. Use 5 to OK.



11.0 Commissioning of solar controller

11.3 Menu "Info"

In this menu mode all measured values and operating states are shown.

If the values are marked as "reset possible", they may be reset in the following way:

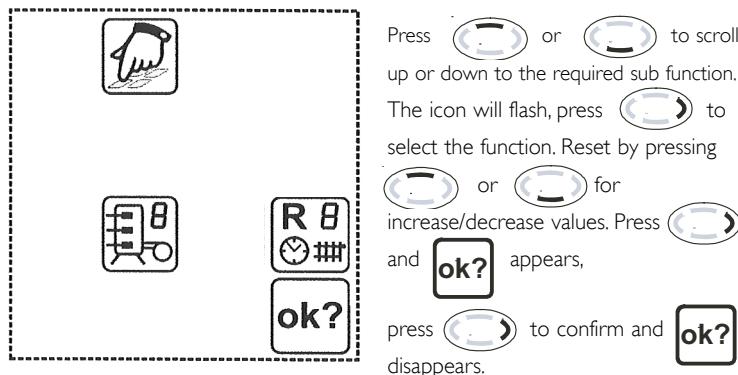
Choose the value with buttons and

Reset value by means of the button

Message "OK?" confirm with = no or = yes

Indication e.g.		Meaning	Reset possible?
75 °C		Indication of current collector(s) temperature.	No
min 12°C		Indication of minimum collector(s) temperature. Resettable to current temperature.	Yes
max 105°C		Indication of maximum collector(s) temperature. Resettable to current temperature.	Yes
52 °C		Indication of current temperature storage tank(s).	No
min 40°C		Indication of minimum temperature storage tank(s). Resettable to current temperature.	Yes
max 65°C		Indication of maximum temperature storage tank(s). Resettable to current temperature.	Yes
60°C		Displays current return temperature	No
60°C		Heating, Cooling, Temperature difference controller T1...T6 * Only displayed when activated	No
35°C		Temperature difference controller for heat consumer * Only displayed if temperature sensor fitted (not supplied as standard).	No
25 °C		Antifreeze sensor Indication of universal temperature measuring points (T6). * Only displayed if temperature sensor fitted (not supplied as standard).	No
1234 h		Operating hours for charging storage tank(s). Resettable to 0 h.	Yes
927 kWh		Energy productivity for storage tank(s). Resettable to 0 h.	Yes

Fig. 30



11.0 Commissioning of solar controller

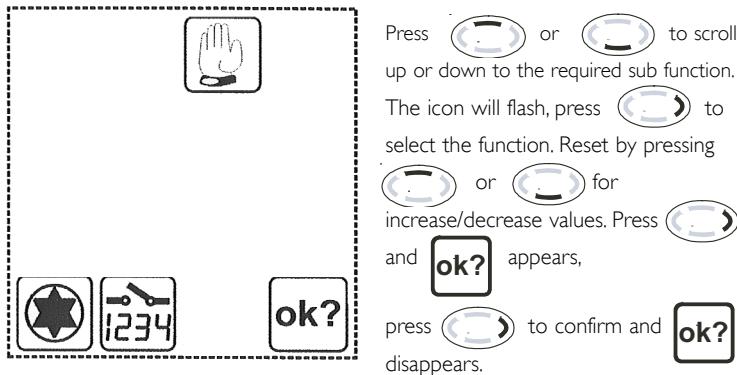
11.4 Menu "Programming"

1. All adjustable parameters can be checked in this menu and, if necessary, changed. The default factory setting will usually give efficient and problem free operation. However Baxi recommend the following parameters marked * must be left at the default settings. Any change to the Baxi recommended settings will invalidate the warranty.

2. For more information or guidance please contact the Technical Enquiries.

Indication		Meaning	Value range	Typical adjustment
max 65 °C		Storage tank 1 or 2 Maximum permissible temperature	15 - 65°C (15 - 95°C Tank 2)	65°C* MAX
dT max 7 K		Storage tank 1 or 2: switch-on differential (dTon)	3 - 40K	7K
dT min 3 K		Storage tank 1 or 2: switch-off differential (dToff)	2 - 35K	3K
Min 100		Adjustment of pump rotational speed. 100% = rotational speed regulation set to 'off'	30% - 100%	100%
13:21		Time	0:00 - 23:59	12:00
40 °C		Switch-on temperature for Heating/Cooling function	20 - 90°C	40°C
dT 10 K		Hysteresis for Heating/Cooling function	1 - 30K	10K
dT max 7K		Temperature difference controller. Hysteresis dT max	3 - 40K	7K

Indication		Meaning	Value range	Typical adjustment
dT min 3K		Temperature difference controller. Hysteresis dT min	2 - 35K	3K
min 00:00 1(2,3)		Timeframe 1(2,3): Start	0:00 - 23:59	00:00
max 23:59 1(2,3)		Timeframe 1(2,3): Stop	0:00 - 23:59	23:59
min 06:00 4		Timeframe 1(2,3): Start for the collector function	0:00 - 23:59	06:00
max 20:00 4		Timeframe 1(2,3): Stop for the collector function	0:00 - 23:59	20:00



11.0 Commissioning of solar controller

11.5 Menu "Manual operation"

1. For commissioning, service and test purposes the solar primary system can be manually operated. For this purpose the switch outputs may be disconnected or connected.

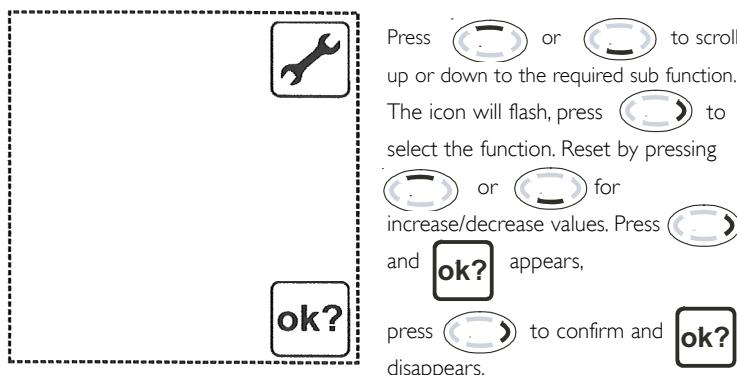
WARNING - During manual operation there is no automatic regulation of the system. Temperature control is isolated. System temperature could be extremely high.

2. To avoid inadmissible operating states this mode of operation changes into "Indication" after approximately 8 hours and the automatic regulation is activated again.

NOTE: Exiting this menu will automatically return the system to normal operation.

Indication	Meaning	Value range
	Switching on/off switch output A1 (solar circulation pump) by hand.	0 = off 1 = on
	Switching on/off switch output A2 (pump2/valve1) by hand.	0 = off 1 = on
	Switching on/off switch output A3 (cooling, thermostat or 2nd temperature difference controller function) by hand.	0 = off 1 = on

Fig. 32



Indication		Description	Value range	Factory set - up
Line / value				
0 -- 0		Collector protection function	0 = off 1 = on	0
1 -- 120 °C		Collector protection function	110..150°C	120°C
2 -- 0		Recooling function (only if the collector protection is on)	0 = off 1 = on	0
3 -- 40 °C		Recooling storage tank temperature	30..90°C	40°C
4 -- 0		Tube collector function - time-controlled	0 = off 1 = on	0
5 -- 2	Note: This Solar Controller has the ability to calculate the energy yield without the use of a flow meter. The Flow Meter is now available as an accessory - Code no. 5122979.	Energy yield measurement 'Off'	0	2
		Energy yield measurement with flow meter	1	
		Energy yield measurement without flow meter	2	
6 -- 11		Energy yield measurement - sets glycol type	0...11	11
7 -- 100		Energy yield measurement - glycol mixture	0 ... 100% 5% - steps	100
8... 10		No value shown, when item 5 is set to 0	-----	10
		Adjustment value when item 5 is set to 1	0.5 – 25Litres per impulse	
		Adjustment value when item 5 is set to 2	0.1 – 75Litres per minute	
9 -- 240		Multiple tank storage systems. Controller response time in seconds	30 - 480	240
10 -- 1		First priority storage tank selection	1 - 2	1
11 -- 0		Antifreeze function	0 = off 1 = on	0
12 -- 6		Anti-freeze function. Reference sensor selection	1 - 6	6
13 -- 3°C		Anti-freeze function start temperature	-20 °C ... +7 °C	3
14 -- 2	Independent controller function		0 = off 1 = cooling 2 = thermostat	2
15 -- 5		Independent controller reference sensor	1 - 6	
16 -- 0		System diagram	0 - 4	0

0	Anro	6	Tyfocor L5.5 - supplied
1	Ilexan E, Glythermin	7	Dowcal 10
2	Antifrogen L	8	Dowcal 20
3	Antifrogen N	9	Dowcal N
4	Ilexan E	10	Tyfocor LS
5	Ilexan P	11	Fernox SI

For correct operation of the system, Baxi recommend the settings shown above.

11.0 Commissioning of solar controller

11.6 Menu "Basic adjustment"

1. Adjustment and changes in this menu must be carried out only by a competent installer or service engineer.

Incorrect adjustments may adversely affect the function of controller and solar primary system.

2. To avoid accidental changes in menu "Basic adjustment", it is not editable in normal functioning but has only a display function. To be able to carry out any changes, this menu must be chosen within the first minute after switching on the appliance. **The basic adjustment menu is 'blocked' automatically one minute after switching on if the menu is not accessed.**

11.7 Overview of display and operating elements

Fig. 33

Graphic symbol	Description	Indication in operation
Measuring points assignment		
	Temperature measuring point collector array 1	
	Temperature measuring point collector array 2	
	Temperature measuring point storage tank 1 solar (storage tank 1 charging)	
	Temperature measuring point storage tank solar (storage tank 2 charging)	
	Temperature measuring point collector - return	
	Temperature measuring point storage tank (auxiliary heating)	
	Antifreezing sensor or universal temperatures measuring point (T6) (no sensor monitoring)	
	Auxiliary heating temperature	
	Operating hours, energy productivity measurement	
Status indication		
	Solar circulation pump	Symbol revolves when solar circulation pump is on
	Switch output 1 is active	Appears when switch output 1 is active (on)
	Switch output 2 is active	Appears when switch output 2 is active (on)
	Switch output 3 is active	Appears when switch output 3 is active (on)
	Reference to system fault	Display flashes when a fault occurs in the system
	Safety query for value changes which are to be stored	Input value can be either Rejected or Accepted

11.8 Overview of display and operating elements
(cont)

Fig. 34

Graphic symbol	Description	Indication in operation
Indicator values		
dT	Temperature difference	
min	Min value	Appears when minimum values are indicated
max	Max value	Appears when maximum values are indicated
min 0:00 I	Time period I start	Appears when the differential controller is active (timeframe I-3) or tube collector is active (timeframe 4)
Max 23:59 I	Time period I stop	Appears when the differential controller is active (timeframe I-3) or tube collector is active (timeframe 4)
888.88	5 x 7 segment display. Presentation of figures 00000 to 99999	Display of all values, display flashes when a value is changed
°C	Temperature in Celsius	
K	Temperature difference in Kelvin	
h	Operating hours	
kWh	Productivity indication in kWh	

11.0 Commissioning of solar controller

11.9 Controller functions

I. The differential temperature controller contains many functions to regulate and monitor the solar primary system. Including

- controller functions for heating the solar cylinder
- functions for system protection and system monitoring
- additional functions (other accessories may be required to achieve these functions).

11.10 General controller functions

I. The controller collects the temperatures from various measuring points and determines the right time to charge the storage tank on account of programmed (additional) functions and controller parameters.

11.11 Cylinder heating by solar primary system

I. Switching action can be adjusted through dT_{max} ($dTon$) and dT_{min} ($dToff$). The solar cylinder is heated by operating the solar pump on output A1 up to the set maximum storage temperature ($65^{\circ}C$). Pump operation starts when the collector temperature exceeds the cylinder temperature by more than $dTon$ and continues while the collector temperature is above cylinder temperature + $dToff$, as set in the programming menu. $dTon$ cannot be set lower than $dToff$ + 1K.

Corresponding values in menu
“Programming”
Maximum temperature
dT_{max} (dT_{on}) Switch-on temperature difference
dT_{min} (dT_{off}) Switch-off temperature difference

11.12 Systems with two storage cylinders

I. For systems with more than one storage cylinder (System Type 2) the cylinder heating can be optimised depending on the energy supply. Usually the cylinder with lower priority will have a lower temperature than that with the higher priority. Re-directing the energy to the lower priority cylinder will lower the temperature in the collector array.

2. To check the collector temperature the heating of the lower priority cylinder will be interrupted for a short while at fixed intervals. If the heating requirement for the higher priority cylinder is fulfilled then the lower priority cylinder will be heated.

3. The higher priority cylinder can be selected in the “Basic Adjustment” menu point no. 10.

11.13 Rotational speed regulation

I. The solar circulation pump on 230V-outputs A1 and A2 can be operated either in switch-mode (two-point controller) or in a rotational speed regulated way. If the rotational speed regulation is activated the pump power is adjusted by a controller so that switch-on temperature difference "Storage tank dTmax" is kept constant as much as possible. At lower deviation of "Storage tank dTmax" the pump is operated with the lowest power till the switch-off wave is reached.

Corresponding values in menu	
“Basic adjustment”	“Programming”
---	Rotational speed min <100%

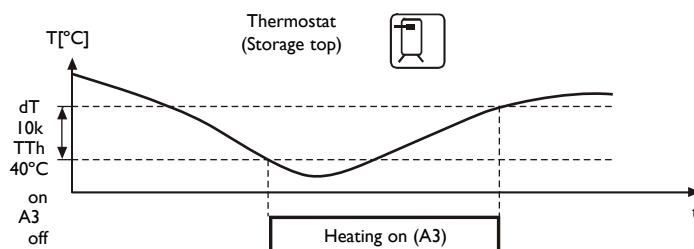


Fig. 35

11.14 Thermostat (heating)

I. The thermostat is an independent control circuit from the storage loading. Thus, auxiliary heating of the top area of the storage cylinder is made possible.

The output A3 will be:

- Switched on, when the temperature falls below the adjusted start level.
- Switched off, when the temperature reaches the adjusted start level + hysteresis.

Corresponding values in menu	
“Basic adjustment”	“Programming”
14 -- 2	Start temperature max °C
15 -- 5	Hysteresis dT in K
	Time period (1...3) Start: min time
	Time period (1...3) Stop: max time

11.15 Thermostat (cooling)

I. In order to optimise the energy yield, it could be useful to "redirect" the solar energy, or to take it away from the storage when the storage temperature reaches a pre-set level. When the sensor reaches the start temperature, output A3 will be switched on. When the temperature level falls below the start temperature hysteresis, the output A3 will be switched off.

Corresponding values in menu	
“Basic adjustment”	“Programming”
14 -- 1	Start temperature max °C
15 -- 5	Hysteresis dT in K
	Time period (1...3) Start: min time
	Time period (1...3) Stop: max time

11.16 Tube collector

1. The function "tube collector" can be switched off/on in the "Basic setting" menu – point 4. Timeframe 4 in the "Program" menu makes it possible to activate this function during certain periods of the day. When activated, the solar pump will be switched on every 30 minutes for a period of 30 seconds to check for any heat gain in the collector.

Corresponding values in menu	
“Basic Setting”	“Programming”
4 -- 1	Time period (4) Start: min time
	Time period (4) Stop: max time

11.17 Sensor monitoring

1. The sensors and their connecting cables are constantly monitored for any break or short circuit. If a faulty sensor is detected by the controller, the symbol  is shown. By scrolling up and down you can detect the source of the error.



The use of the wrong type of temperature sensors can also give to an error message

Indication	Meaning
	Short circuit on temperature sensor of the current measuring point
	Break on temperature sensor of the current measuring point, circulation error at activated energy productivity measurement

11.18 Flow monitoring

1. If during normal operation the flow temperature rises above 90°C a warning indication will be shown.

2. If the energy productivity measurement option is deactivated, the temperature difference between collector and storage tank is checked. If the temperature differential exceeds 60K + dTmax an error message will occur; as under normal system operation where the pump is running, large temperature differences would not normally be seen.

3. If the energy productivity measurement option is activated, the flow rate is checked, if no flow is detected for 15 minutes an error message will be seen (Applicable if Flow Meter fitted).

NOTE: these error conditions will automatically reset after a short period of operation once normal flow/temperature conditions are restored.

Indication	Meaning
 + 	Fluid flow is above 90°C (indication) / Missing circulation in solar circuit

11.19 System protection function

1. The system protection function switches the system off if the "maximum collector temperature" is exceeded by 10K. As soon as the temperature drops below the "maximum collector temperature", the system restarts. This function has priority and is always active, regardless of whether the collector protection is on or off.

11.20 Frost protection

1. This function can be switched on or off by using item 11 in the "Basic adjustments" menu. The start temperature can be adjusted with item 13. Furthermore, a frost protection sensor can be selected (T1-T6, point 12).

2. If the measured value is lower than the start temperature, the solar pump is activated until the adjusted frost protection start temperature +5K is reached. The minimum runtime of the pump is 5 minutes.

3. For safety reasons the function is deactivated if the temperature of the priority storage falls below 5°C.

11.21 Energy productivity measurement

I. For the purposes of energy productivity measurement (solar gain), a sensor on the collector return line and an optional flow meter are required. The yield value is calculated from the values of the temperature difference between the collector and collector return line and the value measured by the flow meter. This function is switched on and off in the "Basic settings" menu.

Corresponding values in menu		
“Basic Setting”	“Programming”	“Info”
5 -- 1	---	XXXX kWh

11.22 Operating hours meter

I. When the storage tank is being charged by a pump, the operating hours meter records for each separate pump. The number of operating hours can be read in the "info" menu. This may be reset to '0'.

Corresponding values in menu	
“Programming”	“Info”
---	XXXX h

12.0 Setting the system flow rate

Fig. 36

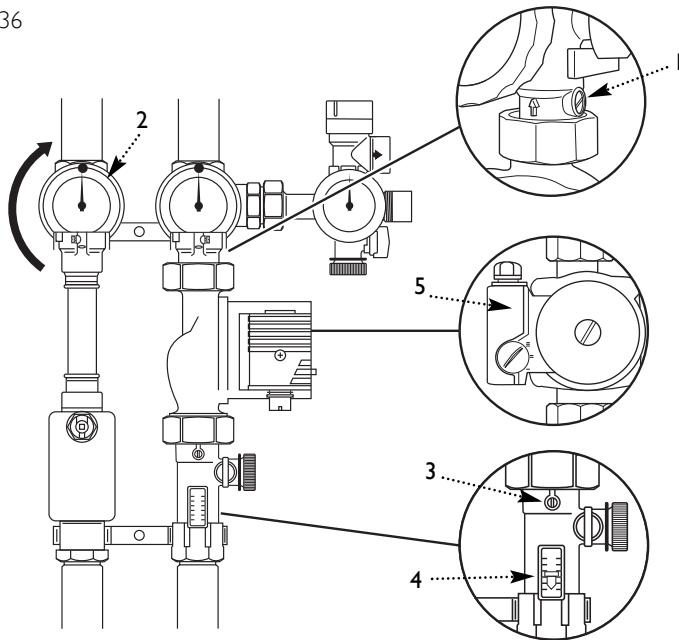
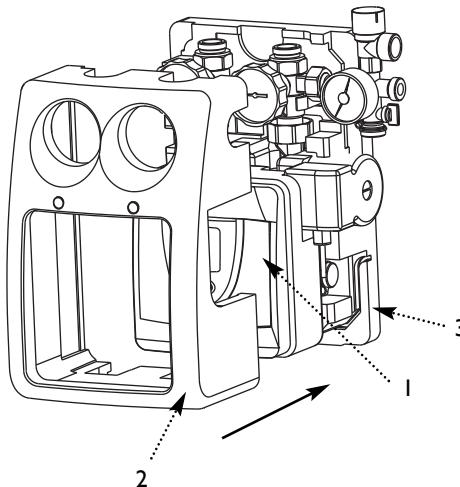


Table 1

Flow rate (when system is cold)	
Area	l/min
2m ²	2 - 4
3m ²	3 - 6
4m ²	4 - 8
5m ²	5 - 10
6m ²	6 - 12

Fig. 37



12.1 Checking and adjusting the flow rate

1. Adjust the flow rate when the system is cold (approx 20°C) (see Fig. 36).
2. The flow rate should be adjusted to give the optimum flow rate depending on the number and type of collector(s) connected.
3. Manually operate the solar pump (See Section 11.5).
4. Set the solar pump speed selector (Fig. 36 Item 5) so that the required flow rate is achieved or exceeded with the lowest possible setting. The flow limiter adjusting screw (Fig. 36 Item 3) can be used to fine-tune the flow rate.
5. Depending on the number and type of collectors installed, set the required flow rate from table (See Table 1).
6. The float in the flow meter will indicate the circulation flow rate through the flow meter sight glass (Fig. 36 Item 4).
7. Adjust screw of the flow limiter (Fig. 36 Item 3) with a screwdriver, until the upper edge of the float in the sight glass indicates the required flow rate (Fig. 36 Item 4). Turn the screw anticlockwise to increase the flow.
8. Ensure that the float is stable when the pump is running.
9. Set manual pump operation to off (See Section 11.5).

12.2 Installation of the thermal insulation

1. Refit the controller mounting moulding (Fig. 37 Item 1) onto the rear moulding.
2. Push the front thermal insulation (Fig. 37 Item 2) against the rear thermal insulation section (Fig. 37 Item 3) until it clips into place.

Commissioning record

The following chart should be completed during Commissioning of the system.

Installer: _____ BPEC No.: _____

Contact details: _____ Serial Nos. Cylinder _____

Original commissioning date: _____ Collector _____

General Commissioning		Solar differential temperature controller - operational parameters		
All pipework correctly installed, identified and earth bonded	<input type="checkbox"/>	Storage tank1: Maximum storage temperature	65°C	*
Solar expansion vessel charge pressure checked and set before filling the system	<input type="checkbox"/> bar	Storage tank1: switch-on difference (dTon)	7 K	
Solar primary system filled with heat transfer fluid supplied	<input type="checkbox"/>	Storage tank1: switch-off difference (dToff)	3 K	
System pressure test carried out	<input type="checkbox"/>	Storage tank2: Maximum storage temperature	90°C	*
Air vented from system	<input type="checkbox"/>	Storage tank2: switch-on difference (dTon)	7 K	
Exposed pipework insulated using high-temp and weather resistant insulation (bird/rodent-proof)	<input type="checkbox"/>	Storage tank2: switch-off difference (dToff)	3 K	
collector installation weatherproof	<input type="checkbox"/>	Minimum pump power on rotational speed regulation	100%	
Collector fixings checked and secure	<input type="checkbox"/>	Switch-on temperature of thermostat function	40°C	
Hydraulic Station		Hysteresis of thermostat function	10 K	
System pressure when cold	bar	2nd temperature differential controller maximum temperature Tmax	65°C	
Solar primary flow when cold	l/min	2nd temperature differential controller hysteresis dTmax	7 K	
Isolating/non-return valves (flow and return) in operating position	<input type="checkbox"/>			
Solar Collectors		Adjustable in menu "Basic adjustments"		
Collector visually inspected for defects	<input type="checkbox"/>	Switching on or off the function collector protection	0 = off	*
Collector temperature sensors correctly installed and secured	<input type="checkbox"/>	Temperature at which the collector protection function is active	120°C	*
Pipe entry points to building weatherproof	<input type="checkbox"/>	Switching on or off the function recooling (only when the collector protection is on)	0 = off	*
Solar Differential Temperature Controller		Temperature to which the storage tank is recooled when collector protection function is on	40°C	*
Record all operational parameters set (see separate table)	<input type="checkbox"/>	Function for time-controlled circulation in operation with tube collectors	0 = off	
Pump operation tested in automatic and manual modes	<input type="checkbox"/>	Switching on or off the function energy productivity measurement	2 = on	
All cables correctly installed and secured	<input type="checkbox"/>	Choice of glycol types used	0 = Anro	
Suitably fused isolating device installed	<input type="checkbox"/>	Mixture ratio of coolants	50%	
Controller earthed	<input type="checkbox"/>	Litres per min	10 l/m	
Solar Cylinder		Switching on or off the function antifreezing	0 = off	
Cylinder installed and commissioned in accordance with cylinder installation instructions	<input type="checkbox"/>	Temperature at which the antifreezing is active	3°C	
		Alternative choice of the cooling, thermostat function or the 2nd temperature differential controller	2	
		System type	type 0	
		Time control in secs	240	
		Storage priority	I	

* Baxi recommends these settings are left at the default value.

	Date / /													
Check condition of all pipework + insulation	<input type="checkbox"/>													
Check condition of mountings	<input type="checkbox"/>													
Check frost protection of solar fluid (every 2 years)														
Concentration	<input type="checkbox"/>													
Check pH (7.0 - 9.5)	<input type="checkbox"/>													
Protection to °C	<input type="checkbox"/>													
Next check date	<input type="checkbox"/>													
Check solar expansion vessel charge pressure														
	bar													
Check solar primary system pressure (cold)														
	bar													
Check solar primary system flow rate														
	l/min													
Check operation of PRV	<input type="checkbox"/>													
Check discharge vessel fluid level	<input type="checkbox"/>													
Check sensor operation (use resistance/temperature table. See page 43)	<input type="checkbox"/>													
Check solar cylinder in accordance with manufacturer's instructions	<input type="checkbox"/>													
Ensure system is free of air	<input type="checkbox"/>													
Visually check condition of solar collector mountings	<input type="checkbox"/>													
KWh recorded (if applicable)	<input type="checkbox"/>													
Visually check condition of any waterproofing around pipe entries to roof and roof fixings	<input type="checkbox"/>													
Engineer's initials	—	—	—	—	—	—	—	—	—	—	—	—	—	—

13.1 Check heat transfer fluid

1. The heat transfer fluid must be checked every year with regard to its antifreeze and pH value. (7.0 - 9.5)

- Check antifreeze using antifreeze tester. Target value is approximately -21 deg C (40% concentration). Replace fluid if necessary.

13.2 Maintenance of the collector

1. The collector or the collector array must be checked/serviced annually to check for any damage, leaks or contamination.

2. In areas where there may be a build up of dirt on the collector, only non-abrasive cleaning materials and methods should be used to clean the collectors and mounting system components.

13.3 Cylinder

1. Refer to manufacturer's documentation.

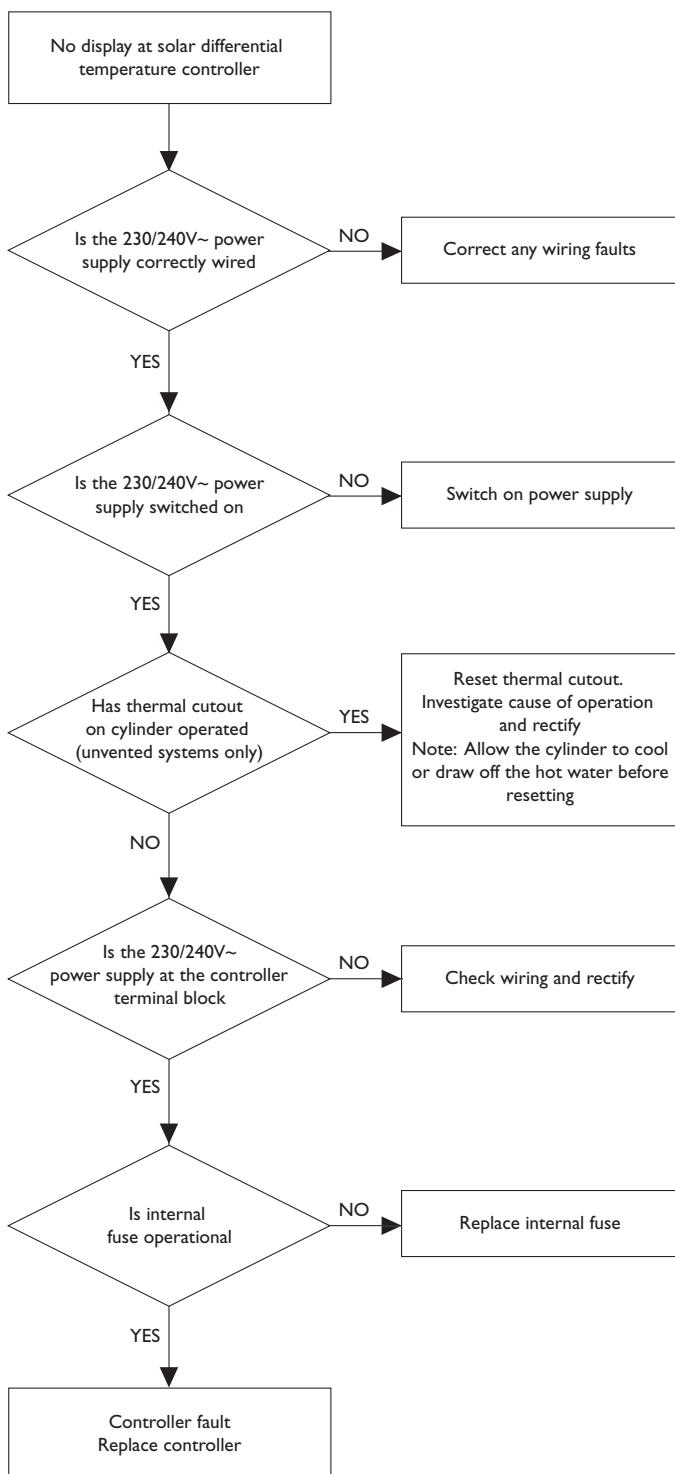
14.1 Failures with error message

1. Some system failure modes can be recognised by the solar differential temperature controller and will be indicated by an error message on the controller display. Refer to the table below for details of possible errors and suggested measures to rectify.

NOTE: These error messages will automatically reset when the fault has been rectified. In the case of the circulation error this may take a few minutes to clear once normal flow has resumed.

Error representation on display	Possible reasons	Measures
  flashing	<ul style="list-style-type: none"> • Sensor wire broken • Sensor defect • Sensor missing 	<ul style="list-style-type: none"> • Check wire • Check sensor resistance, if necessary exchange sensor • Check parameter settings and sensor installation requirements
  flashing	<ul style="list-style-type: none"> • Short circuit in sensor wire • Sensor defect 	<ul style="list-style-type: none"> • Check wire • Check sensor resistance, if necessary exchange sensor
Circulation error: no flow    flashing	<ul style="list-style-type: none"> • Error in pump connection • Pump defect • Air in the system • Connection with flow meter defect 	<ul style="list-style-type: none"> • Check cabling • Exchange pump • Check the float of the flow meter moves when the system runs (if visible) • Check wire
Additionally at energy productivity measurement:  	<ul style="list-style-type: none"> • Sensor wire broken • Sensor defect • Sensor missing 	<ul style="list-style-type: none"> • Check wire • Check sensor resistance, if necessary exchange sensor • Check parameter settings and sensor installation requirements

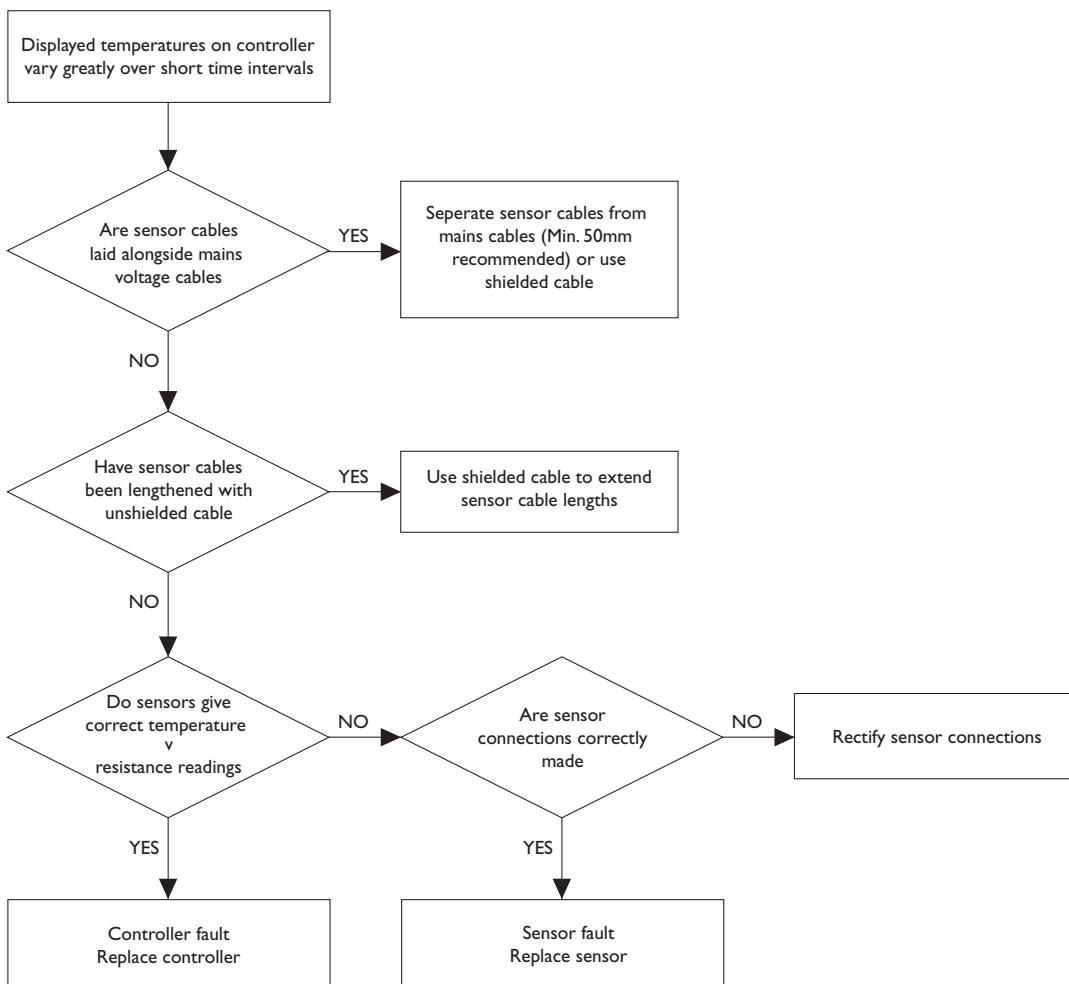
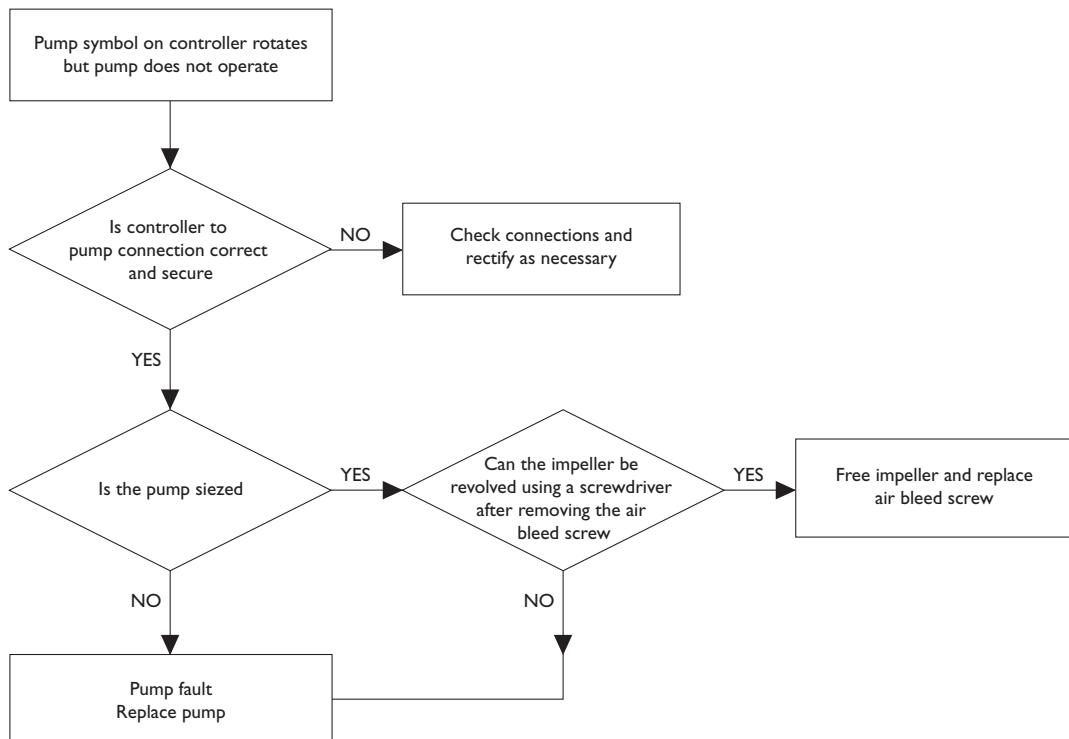
14.0 Fault finding



Resistance table PT1000.

The correct function of temperature sensors can be checked on the basis of the following temperature resistance table with a resistance measuring instrument:

Temperature in °C	Resistance in Ohm
-30	882
-20	921
-10	960
0	1000
10	1039
20	1077
30	1116
40	1155
50	1194
60	1232
70	1271
80	1309
90	1347
100	1385
120	1461
140	1535
200	1758

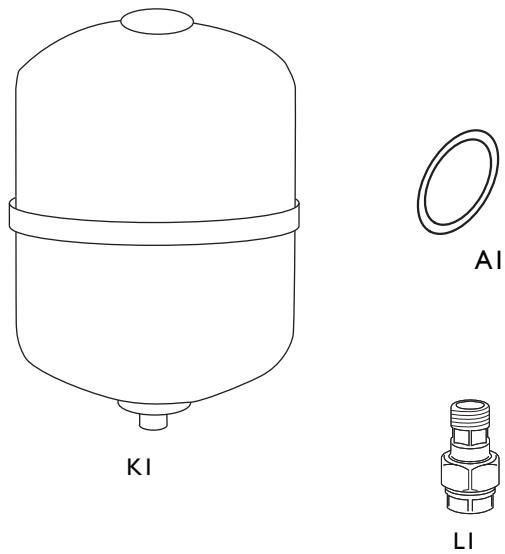
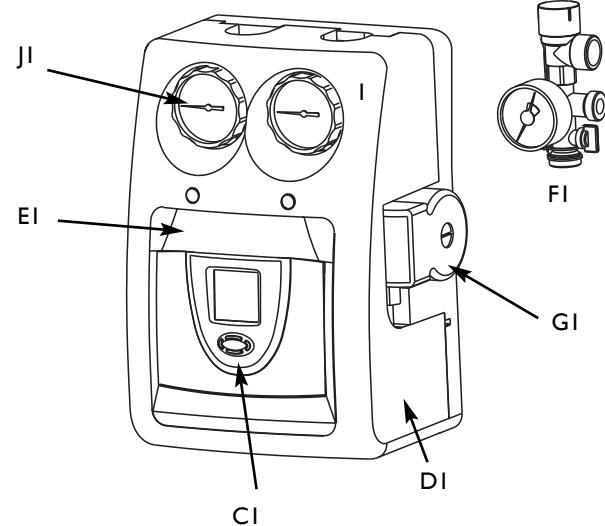


15.0 Spares

15.1 Spare parts and Accessories

I. A number of Spare Parts are available should any part of the system require replacement. Use only genuine parts obtained from Baxi, use of other non Baxi parts may cause system malfunctions and will invalidate the warranty. Fitting of any spare parts must be carried out by a competent installer or authorised service engineer or agent.

Short Parts List



Key No.	Description	Manufacturer's Part No.
AI	Connection Washer	5119535
BI	Temperature Sensor	720224801
CI	Solar Differential Temperature Controller	720709001
DI	Insulation	720689701
EI	Insulation Insert	720689901
FI	Safety Group	720690901
GI	Solar Primary Circulating Pump	720688101
JI	Temperature Gauge	720689101
KI	Solar Expansion Vessel 24Litres	5119548
LI	Expansion Vessel Self-sealing Connection	5119779

16.0 Warranty

16.1 Standard Warranty Terms & Conditions

Flat Plate Solar Collectors 10 Years
Evacuated Tubes Collectors 5 Years
Solar Control Station 2 Years

To receive your free warranty please complete the form supplied with the system within 30 days of installation, or simply call heateam, the service division of Potterton on 0844 871 1568

Our promise to you

If you experience a fault with your new Solarflo system, we aim to provide a safe and high quality repair service supported by our dedicated national network of highly skilled engineers. If your installer can't resolve the problem for you, we will do everything we can to get an engineer out to you as quickly as possible. Nothing in this warranty will affect your statutory consumer rights.

What you need to do if you experience a problem with your system.

You should always contact your installer first because the fault may not be related to the Solarflo installation. If your installer confirms that the fault is within the Solarflo system itself and he/she decides they cannot repair it our friendly customer service team is on hand to help. Simply call our service division heateam on 0844 871 1568 informing the operator that you are a Solarflo customer. They will be able to provide you with technical help or assist with booking an engineer visit if required. Our contact centre is open Monday to Friday 8am - 5pm, excluding Christmas Day and New Years Day.

When calling heateam you must have the following information to hand: -

Solarflo serial number (Affixed to Solar controller)
Solarflo system model number (Affixed to Solar controller)
Your Postcode and House Number
Your installer name, address details and contact details
Proof of purchase (if you do not have the Solarflo serial number or model number)

What this warranty covers

1. Free of charge repair or replacement of components found to be faulty from manufacture.
2. Free of charge replacement of the complete assemblies provided always that the failure is related to a manufacturing fault that cannot be repaired or is beyond repair.
3. The warranty runs from the date your product is installed.

What this warranty does not cover

4. Solarflo collectors that are installed damaged or damaged during installation. If a Solarflo collector is found to be damaged on delivery then it must not be installed, simply return it to your supplier for replacement under warranty.
5. Correctly specified solar fluid will protect the installation down to outside temperatures of -20°C. System failure resulting from incorrect fluid (thereby resulting in freezing fluid in the system) is not covered under warranty.
6. The warranty will become invalid if the failure is due to frost damage (see point 5), transient voltages, lightning strikes or any act of vandalism or misuse.

16.1 Standard Warranty Terms & Conditions (cont)

7. This guarantee does not cover the effects of scale.
8. Tampering or modification will invalidate this warranty.
9. The installation must be in an appropriate location and its use is restricted to potable water.
10. Baxi Heating UK Ltd will only carry out warranty repair/replacement to Solarflo collectors which have safe access and that meet current Health & Safety working at heights requirements. The customer will cover the cost of any safety equipment e.g. scaffolding and lifting equipment etc. that is required to meet this standard and will appoint a contractor to carry this work out. heateam accepts no liability for any third party damage.
11. Repairs to Solarflo system that haven't been installed and commissioned properly, as set out in the installation and commissioning instructions.
12. Any other defects or failures, either in the connected system or outside of the Solarflo system itself.
13. Installations within commercial settings for which this Solarflo system was not designed.
14. Reimbursement of any third party repair or replacement costs that we haven't been told about and agreed with you in advance.
15. Compensation for consequential losses (e.g. loss of earnings, business losses, stress and inconvenience) arising from a product breakdown, including repair delays caused by factors outside our reasonable control.
16. heateam will not be liable for failures resulting from fair wear and tear, willful or accidental damage, negligence, abnormal working conditions, failure to comply with instructions (whether oral or in writing), misuse or alteration of the product without heateam's approval.
17. Defects which are reported out with the warranty period will not be covered by this warranty.
18. Installations which have not been carried out by fully trained and competent person(s) will not be covered by this warranty.
19. Products that have been subjected to the following conditions will not be covered by the warranty:
 - a) prolonged stagnation conditions or products that exhibit signs of extreme temperature exposure
 - b) acts of god, explosions, floods, tempests, inclement weather, fire or accident
 - c) war, sabotage, insurrection, civil disturbance or requisition
 - d) acts, restrictions, regulations, by-laws, prohibitions or measures of any kind on the part of any Governmental, Parliamentary or Local Authority
 - e) theft or malicious damage

All descriptions and illustrations provided in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet. All goods are sold subject to our standard Conditions of Sale which are available on request.

BAXI

A Trading Division of Baxi Heating UK Ltd (3879156),
Brooks House, Coventry Road, Warwick. CV34 4LL

Technical Enquiries 0844 871 1568

Our contact centre is open Monday to Friday 8am to 6pm,
Weekends and Bank Holidays 8.30am to 2pm.

We are closed Christmas Day and New Years Day.

Website www.baxi.co.uk

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